The Journal of the American Medical Association

Published Under the Auspices of the Board of Trustees

VOL. 120, No. 7 — CHICAGO, ILLINOIS — OCTOBER 17, 1942

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SUBTOTAL GASTRECTOMY FOR STENOSING DUODENAL ULCER

CHAIRMAN'S ADDRESS

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BOSTON

When duodenal ulcer becomes a surgical problem, it can be classified roughly into four categories. These are acute perforation, massive hemorrhage, intractability and cicatricial occlusion. Although I wish to emphasize in this discourse the more careful consideration of stenosing ulcer of the duodenum, it is difficult to avoid a brief summary of the other complications of duodenal ulcer. This is done to call attention again to the importance of the problem as a whole and to avoid misconception regarding the treatment of a relatively small percentage of all patients who are afflicted with this lesion.

ACUTE PERFORATION

There is little dispute regarding the advisability of early operation and simple closure in the first group. The earlier the closure is done, the lesser the risk, provided the perforation is under twelve hours' duration. If delay has inadvertently passed this time limit, one may do well to evaluate the question of spontaneous sealing and further conservative measures.[1]

In some communities the mortality is higher than it is in others, as the result of an older age group affected, delay in hospitalization and the virulence of the current respiratory tract infection. In a series of cases analyzed by Ulfelder and Allen,[2] perforation, closed within three hours, was found to carry a mortality rate of approximately 5 per cent, while in those in which operation was done during the second three hour period the mortality rose to 18 per cent. Radical operations for acute perforation, in our opinion, are contraindicated.

MASSIVE HEMORRHAGE

I have reported on acute massive hemorrhage associated with duodenal ulcer and feel that, in our own geographic locality, we can expect certain rules to apply.[3] It is obvious that the experience in some communities is similar to ours, while in other areas the prognosis is better than it is with us. In the vicinity of Boston we find that approximately 9 per cent of all duodenal ulcer patients coming to the Massachusetts General Hospital have massive, acute bleeding. Thirteen per cent of these die of acute anemia, if treated conservatively, even if more modern methods of early feeding and so on are used. Thus the complication of hemorrhage can account for 1.3 per cent mortality in all duodenal ulcer patients treated in one clinic. The summary of our data reveals that nearly all the patients under the age of 45 will spontaneously recover from acute bleeding, while approximately 30 per cent of those above this age will succumb. This variation, we believe, is largely due to the inability of an arteriosclerotic vessel to contract sufficiently to hold in place a thrombus over a long enough period of time. We have further shown that operation, undertaken in this older age group after a week or more of repeated bursts of bleeding, will nearly always fail. On the other hand, if operation is carried out within seventy-two hours of the onset of bleeding, success is likely. Actually, in 6 instances in my own group, all of those bleeding massively for more than seven days at time of operation died, with one exception. Of 9 patients operated on within seventy-two hours of onset, 8 recovered. All of these were in or beyond the fifth decade of life. The last patient in this group was 77 years of age.

It is obvious to us that the younger patient should be allowed to regain an optimum state of health and then be subjected to radical cure. The older patient should be carefully evaluated, the diagnosis established by immediate fluoroscopy if necessary and the decision made for or against surgical treatment within seventy-two hours of onset. If conservative treatment is elected for one reason or another, one should not be persuaded to attempt a late rescue. I have seen a few of these patients recover spontaneously after a time when death seemed certain; and these more than offset the chance of surgical success after several days of severe bleeding

INTRACTABILITY

The term intractability is difficult to define. We use it to cover a group of recalcitrant ulcer patients who for one reason or another cannot get along on conservative measures. Approximately 5 per cent of duodenal ulcer cases treated in our clinic fall into this group. I have included in this category ulcers deeply penetrating the pancreas, those interfering with the proper function of the biliary tract and those that involve the pyloric sphincter. These locations make it difficult for the patient to remain symptom free except on a strict hospital regimen. Also there are economic factors that enter into the picture in some of these individuals to

Read before the Section on Surgery, General and Abdominal, at the Ninety-Third Annual Session of the American Medical Association, Atlantic City, N. J., June 11, 1942.

1. Wangensteen, O. H.: Nonoperative Treatment of Localized Perforation of the Duodenum, Minnesota Med. **11**: 477 (July) 1935.

2. Ulfelder, Howard, and Allen, A. W.: Acute Perforation of Ulcers of the Stomach and Duodenum, New England J. Med., to be published.

3. Allen, A. W., and Benedict, E. B.: Acute Massive Hemorrhage from Duodenal Ulcer, Ann. Surg. **98**: 736-749 (Oct.) 1933; Acute Massive Hemorrhage from the Upper Gastrointestinal Tract, Surgery **2**: 713 (Nov.) 1937.

such an extent that quiescence of the ulcer is incompatible with work. Some of them may be aided by the psychiatrist, while others are actually not willing to help themselves or do not possess the intellect to carry on their job and take care of their malady. The surgeon should review with great care any patient referred to

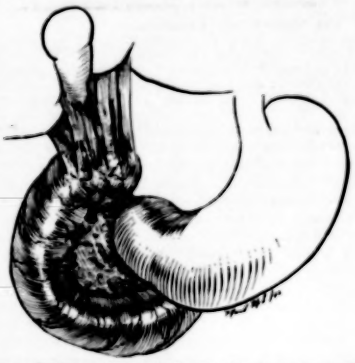

Fig. 1.—Typical stenosing duodenal ulcer, old adhesions not interfering with ideal operation.

him with so-called intractable ulcer. He will often be confronted with the burden of the entire treatment and will find less cooperation on the part of his patient than he is accustomed to in dealing with the average surgical problem. It is in this group that we are really on trial as to the outcome of our endeavors, and it is from these patients that we can expect the highest percentage of failures. I am sure that if we have learned to relieve the majority of such individuals by surgical methods they have taught us much regarding our present conception of the proper operative procedures to carry out for the relief of duodenal ulcer.

STENOSING DUODENAL ULCER

Either because of repeated activity with extension in a circular direction or because of the development of multiple ulcerations on opposite walls of the duodenum, there comes about a constriction from scar tissue in a certain proportion of ulcer patients. Although such cicatricial occlusion to the outlet of the stomach is occasionally encountered in the young adult, it is more often found in those past middle life. There is in either case a prolonged ulcer story with almost constant or recurrent signs of activity, requiring some attention on the part of the victim to more rigid efforts directed toward the relief of symptoms. This finally becomes a mechanical problem and the patient seeks help because he can no longer absorb enough nourishment to maintain life. The onset of such a condition is a gradual one, and the end stage is reached so insidiously that one often finds that the stomach has become enormously dilated. It is interesting that such an organ, emptying infinitesimal amounts of its contents into the duodenum, can exist within a person and create so little distress. Many of these patients have found that emptying their stomachs by tube or induced vomiting once in twenty-four hours gives them a few hours of respite. A considerable number of them are disturbed only by weight loss and gaseous eructations.

On investigation, one often finds the enlarged stomach clearly outlined in an otherwise scaphoid abdomen. Barium sulfate, when introduced, may appear not to leave the stomach during the fluoroscopic examination, and a large residue is noted after twenty-four hours. The roentgenologist has little difficulty in arriving at the obvious diagnosis of pyloric obstruction and has become proficient in the differential diagnosis between obstruction due to old duodenal ulcer and malignancy of the prepyloric region. The gastric secretions in such cases will show a low or subnormal acidity. This is believed by some [4] to be due to the effect on the acid cells of gastritis secondary to prolonged obstruction.

Such lesions have been thought to be the end result of healed duodenal ulcer, and I among others have felt that one need do no more than correct the mechanical situation. That this was considered sufficient was based on the opinion that, without recent activity in the ulcer and with the low acid findings, one could expect a good result from some short circuit or pyloroplasty type of operation. The immediate results from such procedures in this group have been good and, in many instances, appear to continue satisfactory. Although we believe there are a greater percentage of cures in this type of ulcer patient by palliative surgery than in any other except those with acute perforation, the question regarding the kind of operation to be done for them should be reviewed.

In my personal cases there have occurred 3 jejunal ulcers following posterior gastroenterostomy for cicatricial obstruction. Two of these were in elderly men, who obtained relief by gastroenterostomy for several years. Having lived on an ulcer regimen off and on for a greater part of their lives, it was easy in well established households to continue a reasonable existence after operation. In each instance after the death of the patient's wife ulcer symptoms returned, doubtless as the result more of the abandonment of a proper

Fig. 2.—Exposure of region of common bile duct by turning the duodenum mesially, assuring adequate amount of uninvolved duodenum below the ulcer site.

ulcer regimen than of the natural results of grief. One of these patients had the jejunal ulcer at the age of 82 and it was responsible for a sublethal acute massive hemorrhage. The reestablishment of a sensible mode of living gave him a fairly happy additional two and

4. Ochsner, Alton; Gage, Mims, and Hosoi, Kiyoshi: Treatment of Peptic Ulcer Based on Physiological Principles, Surg., Gynec. & Obst. 62: 257-274 (Feb., number 2A) 1936.

a half years. When the other patient was told of his situation he applied elsewhere for treatment and has, I believe, continued on conservative measures.

More recently a man aged 47 was admitted to the medical wards of the Massachusetts General Hospital with a typical stenosing ulcer of the duodenum. He

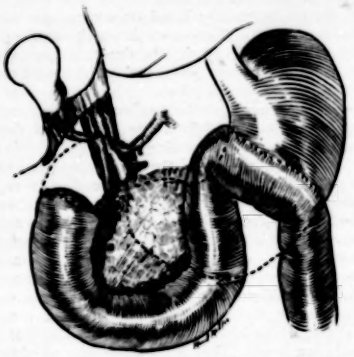

Fig. 3.—Ideal operation completed, consisting in subtotal gastrectomy including first portion of duodenum.

had survived the suture of an acute perforation twelve years previously and had continued since that time with periods of ulcer activity. He was treated conservatively for seventeen days without improvement of the obstruction. His fluid and chemical balance were restored and he was transferred to the surgical wards. During his hospital stay his nonprotein nitrogen remained high and he continued to show albumin and casts in his urine. Gastric analysis revealed 38 units of free acid after histamine. It was felt that he was a poor surgical risk, and posterior gastroenterostomy was performed. He made an uneventful recovery and there was a rapid fall to normal level of his nonprotein nitrogen. He was discharged home on the fourteenth postoperative day greatly improved but was readmitted through the emergency ward seventy-seven days after his gastroenterostomy with all the signs and symptoms of acute perforation.

Operation at this time revealed the perforation to be a large one in a jejunal ulcer opposite the anastomosis. Recovery from the closure of this acute perforation was uncomplicated save for the fact that tenderness and ulcer type of pain persisted. Consequently a third operation consisting of subtotal gastrectomy was done eighteen weeks after the first and six weeks after the second operation. At this time the patient was in better physical condition than at his first procedure but, considering the necessary extent of the final operation, the prolonged disability and the narrow escape from death following the acute perforation, we are convinced that better judgment could have been used in the first place. His recovery was uneventful following his last operation and he was discharged home on the fifteenth postoperative day. So far he has remained symptom free, having returned to light work two months after discharge. He has gained 6 pounds (2.7 Kg.) in weight in the past eight weeks, this gain becoming evident about three months after operation.

I am sure that before we subject patients with cicatricial obstruction subsequent to duodenal ulcer to operation we should seriously consider more radical surgery than we have formerly advocated. In the past five years we have subjected several such patients to subtotal gastrectomy and have been agreeably surprised to find that in such cases the operation is technically made easier by the nature of the process. The large stomach is easily handled, and the lack of acute inflammation about the ulcer site enhances a safe resection into healthy duodenum. We have at times prepared these patients for gastrectomy by preliminary jejunostomy for feeding. More recently, however, we have depended on artificial methods for the restoration of fluid and chemical balance and followed the resection with concomitant jejunostomy so that there would be little delay in utilizing the gastrointestinal tract. These patients have done well and, in accordance with our past experience with postoperative ulcer cases, we are sure that they are as nearly immune from further ulcer trouble as it is possible to make them in the light of our present knowledge of this lesion.

One may inquire into the acidity in this group and rightly wonder why activity should return after palliative operations. It is difficult to obtain dependable analysis of the stomach contents in the presence of a gastroenterostomy. Attempts have been made by many observers, and some by persistent effort seem to have shown that the acid level is at times high under these circumstances. Although difficult to prove, I believe that the decompression accompanying gastroenterostomy or pyloroplasty in these cases allows the acid cells

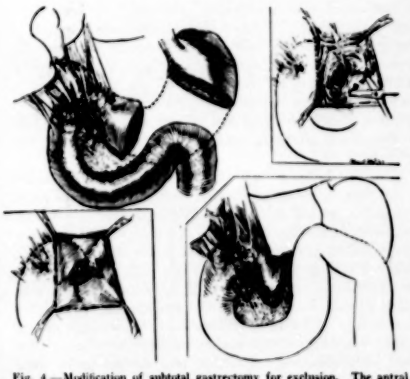

Fig. 4.—Modification of subtotal gastrectomy for exclusion. The antral mucosa has been removed before closure of the distal stump. This operation is applicable when ulceration and inflammatory reaction are extensive.

to regain their former activity. This being the case, if true, it is not surprising that the complication of jejunal ulcer occurs, since the patient has an ulcer diathesis and returns to his former vulnerability with the elimination of his obstruction.

It seems now that there is a consensus among most surgeons regarding the need of subtotal gastrectomy for the relief of the ulcer patient who cannot be kept

well on conservative measures. I believe we should apply the same principle to patients with cicatricial stenosis from duodenal ulcer. If palliative operations are done in this group, one must be prepared for failure. Certainly no patient in reasonable condition or with a normal life expectancy should be subjected to an inadequate procedure.

I wish to call attention to the differential diagnosis between the type of scar tissue stenosis just discussed and the edematous obstruction frequently seen in the acute exacerbation of duodenal ulcer. In the former group the condition is insidious in onset, and in most of the cases a long history of ulcer symptoms is obtained. In this group the obstruction fails to respond to conservative measures. In those with edematous occlusion the onset is rapid and coincident with an obvious return of symptoms compatible with ulcer activity. These individuals are of a younger average age, and on decompression with a Levine tube and supportive measures the edema subsides within a period of ten to fourteen days. Treatment after the acute episode has passed is dependent on the usual factors governing duodenal ulcer management in general. Many such patients have not had a fair trial on a conservative regimen and should not be subjected to radical surgery until it is obvious that for one reason or another it is justifiable.

Subtotal gastrectomy for duodenal ulcer, as the procedure of choice for the relief of the small group of ulcer patients who fail to respond to conservative management, has come about by the trial and error method. Every conceivable less extensive operation has been advocated in the past. Owing to the poor selection of cases requiring surgery in the earlier years of our experience, the results obtained have been difficult to evaluate. Conservative operations applied to the group that we now believe require surgery for cure are associated with such a high percentage of failures that we are convinced of the rationale of a radical operation when any is done. This, in my opinion, means the removal of not less than one half of the distal stomach, including the antrum and the pylorus.[5]

Connell [6] believes that good results can be obtained by an extensive fundusectomy, thus eliminating a large proportion of the acid cells. We have had no experience with fundusectomy per se but believe that we have accomplished the elimination of a similar amount of the acid cell area in many of our subtotal resections for exclusion. In this group, if the antral mucosa was left in situ the incidence of anastomatic ulcer was higher than in any of the other conservative operations in our cases. This experience makes us feel that the antrum must be eliminated entirely if one wishes to be sure of the end result.

After subtotal resection it is often apparent on examining the specimen that antral cells extend much farther into the mid-stomach than is normally expected. In fact, it is not uncommon in a chronically dilated stomach to find smooth mucosa without rugae a distance of 10 to 12 cm. proximal to the pylorus. Since some of the surgeons in our own institution have resected a smaller segment of stomach than others, we have been able to compare the results according to the extent of the operation. It was found that the results were good in all patients who had had the distal half or more of their stomach removed. Those having pylorectomy or partial gastrectomy of less than one half gave a high incidence of good results, but some of them had continued symptoms, usually based on anastomotic ulcer. We believe that the discrepancy in results in the less extensive resections may well be due to the anatomic variation in the extent of antral cells in different patients operated on for ulcer.

The ideal operation at the moment seems to me to consist in a resection of from one half to two thirds of the distal stomach, including the antrum, pylorus and ulcer bearing portion of the duodenum. This can be carried out in the stenosing ulcer group more regularly than in any other, although in most of the patients operated on for intractability or massive hemorrhage we have been able to accomplish the same procedure. The complications of present day gastric resection for ulcer are nearly all based on the difficulty in the management of the duodenum. In a series of sixty-five consecutive gastric resections for uncomplicated gastric ulcer at the Massachusetts General Hospital, there has been only one death. During the same interval of time a larger number of duodenal ulcer patients have been operated on by the same group of surgeons with a mortality rate of about 5 per cent. This variation is largely due to the complications arising from the duodenal segment during and subsequent to the operation.

If a patient with duodenal ulcer must be subjected to operation for one reason or another, it is wise to have at our disposal a variety of maneuvers. We feel that gastroenterostomy or pyloroplasty should be used rarely, since the ultimate outcome so often proves unsatisfactory. Subtotal resection for exclusion as advocated by Finsterer [7] is not followed by any better results than the less radical palliative operations. If the antral mucosa is removed from the remaining distal segment, as originally advocated by Finsterer,[8] then the results in a comparable group of our own cases have proved satisfactory. We use this modification of the ideal procedure with some reluctance, since we have found that the antrum is a thin friable structure after its mucosa is eliminated and offers, under these circumstances, tissue that may not lend itself to suitable closure.

One may in difficult cases deliberately plan a two stage resection as advocated by McKittrick.[9] This consists in the Finsterer exclusion subtotal gastrectomy as the first stage, leaving the antrum and ulcer area in the duodenum intact and undisturbed. The second stage comprises the relatively simple procedure of removing the antral segment and first portion of the duodenum six weeks later. Although this two stage operation will be found necessary in a relatively small number of cases, it has without doubt a definite place in the role of sound surgical judgment in the treatment of duodenal ulcer.

5. Allen, A. W.: Surgical Treatment of Duodenal Ulcer, Arch. Surg. 44: 501-519 (March) 1942.

6. Connell, F. Gregory: Partial Gastrectomy in Treatment of Peptic Ulcer, Surgery 3: 696-701 (May) 1938.

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8. Finsterer, H.: Ausgedehnte Magenresektion bei Ulcus duodeni statt der einfachen Duodenalresektion bzw. Pylorus-ausschaltung, Zentralbl. f. Chir. 48: 434, 1918.

9. McKittrick, L. S.: Personal communications to the author.

In the average patient, who has had suitable preparation, one can usually accomplish an ideal resection with little difficulty and with a low mortality rate. It is wise to continue preoperative preparation as long as the patient improves and until acute reaction about the ulcer site has subsided. When it is decided that an ulcer patient had best submit to radical operation, the surgeon should delay his part in the program until he feels that the circumstances are best for a happy outcome. Although this may mean waiting no longer than it takes to combat shock from massive hemorrhage, it more often means waiting several weeks for an acute ulcer to subside and for the patient to regain the body tone lost by bed rest. Often the patient may be given a better chance by a two weeks ambulatory period before the operation is undertaken.

At the time of operation the surgeon must decide the procedure best suited in that particular case. The extent of the reaction about the ulcer site, the condition of the patient at that time and other technical hazards must be weighed. One may without harm free the lateral border of the duodenum and determine the course of the common bile duct without disturbing the protective adhesions about a penetrating ulcer. Often one finds the duodenum foreshortened and drawn into the liver sulcus, and this should not be tampered with until a decision has been reached that there remains a sufficient amount of normal duodenum between the ulcer and the papilla of Vater to allow an adequate closure of the duodenal stump. If, on inspection, it is found that the inflammatory reaction involves too much of this area for comfort, one should immediately resort to one form or another of the exclusion operation. Occasionally one finds that there is sufficient duodenum beyond the pylorus but proximal to the ulcer for adequate closure. This circumstance is, in our opinion, one that can be safely met by leaving the ulcer in situ, since with the duodenum adequately closed above it the ultimate result will be satisfactory.

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TECHNIC

The technic of operation for subtotal gastrectomy for duodenal ulcer is varied by different surgeons. Some begin by freeing the duodenum and closing the remaining duodenal segment. I have seen this skilfully done by several men. Often, however, the difficult part of the operation is easier for me if I approach it from the other direction. For this reason I have routinely freed the gastric segment and transected it prior to the dissection in the region of the ulcer. This method allows a free exposure of all sides of the inflammatory area and makes it possible to remove this segment under direct vision. In my own hands I feel that there is better control of the situation when this is done. One can easily avoid undue injury to the adherent pancreas and keep in view the bile ducts and other structures in this area with more assurance. If one elects to free the stomach segment first, it is made easier for the operator if he stands on the left side of the patient. By freeing the greater curvature in the beginning, one can, by placing the left hand behind the stomach, control the left gastric vessels on the lesser curvature with greater facility.

I have found fine chromicized catgut on atraumatic needles satisfactory for the suture lines. Great care is used to infold all mucosa, since healing of these structures takes place only from the serous layer. Thus, a loose but firm approximation of the outer surface of these segments is desirable. If one keeps this in mind, along with adequate control of bleeding, healing will take place quickly and hemorrhage from the cut surfaces will be insignificant.

There is much discussion at the moment regarding anterior or posterior anastomosis following subtotal gastrectomy. In our hospital during the year of 1941 there were forty-nine subtotal gastrectomies for ulcer. About two thirds have had posterior and one third anterior anastomosis. All have done equally well as far as immediate convalescence is concerned. We prefer the short loop posterior hookup in the virgin case with a normal mesocolon that is not thickened by fat deposit. In obese persons and those who have had previous posterior anastomosis we prefer anticolic gastrojejunostomy. In many of those having had anterior anastomosis we have noted troublesome regurgitation of bile from the long proximal segment when the patient reclines at the end of the day during convalescence. This complication is not of great importance and usually subsides after a few weeks. Under no circumstances should one be tempted to relieve this situation in ulcer patients by enteroenterostomy between the jejunal loops, since this will result in anastomotic ulcer in a large percentage of cases.[10]

If one allows the stomach segment to become acutely distended, it will take some time for its tone to return, and this, added to the usual early lack of peristaltic activity in the remaining stomach, delays convalescence. In patients who must be subjected to surgery at a minimum level of safety, as regards blood chemistry and inanition, it is wise to provide concomitant jejunostomy for feeding.[11] If this has been omitted at the original operation and the stoma fails to function for seven days after operation, then jejunostomy for feeding should be done. This procedure will allow easy restoration of fluid and chemical balance, which is not only life saving but enhances the proper functioning of the anastomosis.[12]

Patients who have long been disabled, periodically or continuously from duodenal ulcer, will soon regain self confidence after radical surgery. It requires three to twelve months for some of these persons to acquire an appetite and begin to gain weight. The majority can carry on their usual occupation after three months' convalescence and live comfortably on three regular meals a day. For a time, many of them find it best to eat smaller meals more frequently, but seldom is it necessary to carry this out indefinitely. All are discharged on a six meal bland diet and are given instructions regarding abstinence from highly seasoned foods, alcohol and tobacco. Many of them find that these restrictions are unnecessary. Although our early follow-up results, three to nine years, would indicate that recurrent ulcer is an unusual occurrence, we still feel that these people should regard their apparent good health with gratitude but without complacency.

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MANAGEMENT OF SKULL FRACTURES AND BRAIN INJURIES

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For the last twelve years the senior author has made a hobby of collecting consecutive proved skull fracture records from all sections of the country as a means of securing a cross section of management of brain injury cases by the profession. This paper is based on the accumulated material from 7,031 consecutive proved or practically proved skull fracture-brain injury cases. In addition to the 487 cases that we ourselves have treated or seen in consultation we have collected 6,544 consecutive skull fracture cases covering the period 1928 to 1940 from approximately one hundred surgeons and fifty hospitals representing every section of the country. This report is dedicated to these surgeons and the medical staffs of these hospitals, whose unselfish cooperation has made this clinical investigation possible.

Facts collected from various sources warrant a conservative estimate of 600,000 serious head injuries, one third of them proved skull fractures, as the annual incidence of this type of trauma. With average mortality rates of 10 per cent for serious head injuries without skull fractures and an average death rate of 30 per cent for proved skull fractures, it becomes apparent that 100,000 of our friends, neighbors and relatives are being killed—nearly 300 people each day—by brain injuries. Such a death rate from any one given type of trauma is a challenge to the surgeons of the land worthy of their greatest effort.

TABLE 1.—*Source of 7,031 Consecutive Cases of Proved Skull Fracture Collected*

1. Treated by authors personally	392
2. Seen by authors in consultation	125
3. Consecutive cases (1 to 5 years) sent to authors by over 100 surgeons	925
4. Hospital charts surveyed 1928-1935	2,181
5. Hospital charts surveyed 1935-1940	3,106
6. Various small series collected and combined for study	282
Total	7,031

SOURCE OF SKULL FRACTURE CASES

The source of the 7,031 skull fracture cases included in this clinical investigation is shown in table 1. The causal agency for each case of skull fracture collected furthermore furnishes a cross section of the nation as regards the chief etiologic factors. Motor driven vehicles were responsible for 50 per cent of these skull fractures, falls for 26.8 per cent and blows for 10.3 per cent. Miscellaneous or unknown causes made up the remaining 13 per cent. Such potential etiologic factors are scattered all over the land. Every hamlet, village and city has its quota of craniocerebral injuries.

Moreover, the majority of deaths from skull fractures and brain injuries occur in the first twenty-four hours, depending on the efficacy of the management. In the authors' series of cases death occurred in 64 per cent of the total number of fatal cases within the first twenty-four hours, and 60 per cent of these first day deaths occurred in the first six hours following the injury. In the consecutive cases surveyed from nineteen hospitals 47 to 56 per cent of their total deaths were likewise first day fatalities. Thus it is evident that the type of management rendered during the first twenty-four hours, and especially during the first six hours, spells life or death for many of these victims.

Given the wide distribution and the high preponderance of deaths in the first twenty-four hours, it is axiomatic that:

A. A large proportion of brain injuries must be treated in hospitals far removed from the centers where neurosurgeons work.

B. The full responsibility for reducing the mortality rate in the majority of instances rests on the shoulders of the general physicians and surgeons who first see these cases.

"SKULL FRACTURES" VS. "HEAD INJURIES"

Injuries to any one or all of the three intracranial elements are grouped under the general heading "brain injuries." Not all head injuries are brain injuries. Very few skull fractures occur without some brain injury. The presence and extent of brain injury determine the management and outcome of the case.

Wright and his co-workers [1] reported 349 craniocerebral injuries in 1933. Twenty-five per cent of these were skull fractures. The mortality rate for the entire series was 17.7 per cent. Fay [2] in 1935 reported 655 cases, 30 per cent skull fractures and the remainder showing blood in the spinal fluid, thus indicating comparable seriousness. The mortality rate for his series was 17.8 per cent. Swift and Berens [3] in 1938, reporting 1,747 personal and collected cases, 7 and 15 per cent skull fractures, showed mortality rates of 11.7 and 13 per cent. Mock [4] in 1939 showed a 5 per cent reduction in his skull fracture mortality rate by including an equal number of serious head injuries.

In order to secure uniformity of statistics in this comparative study of management only proved and practically proved skull fractures have been used.

CONTROVERSIES CONCERNING MANAGEMENT

No chapter in surgery is so filled with controversy as the one dealing with the management of acute craniocerebral injuries. Briefly, these controversies during the first forty years of the present century can be summarized as shown in table 2. The literature on management of brain injuries for the last five years indicates greater unanimity concerning certain major life saving procedures than was true for the preceding thirty-five years of this century. However, confusion still exists in the minds of many surgeons regarding the treatment of their occasional cases. The chief dilemmas concern the value of dehydration, whether or not to do a lumbar puncture and when if ever operation is indicated.

There must be a rationale for these procedures which the majority seem to favor and only the few condemn. The Monro-Kellie doctrine, enunciated one hundred years ago, stands as the very foundation of our modern conception of brain injury therapy. This doctrine stated that the total contents of the noncompressible cranium must be approximately equal at all times, but varia-

Owing to lack of space, this article has been abbreviated for publication in THE JOURNAL. The complete article appears in the authors' reprints.

Read before the Section on Surgery, General and Abdominal, at the Ninety-Third Annual Session of the American Medical Association, Atlantic City, N. J., June 11, 1942.

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3. Swift, George W., and Berens, S. N.: Cerebrospinal Injuries, Detailed Study of 1,433 Cases, J. A. M. A. **111**: 1448-1452 (Oct. 15) 1938.

4. Mock, Harry E.: How Can the High Mortality Rate in Skull Fractures Be Reduced? Proc. Nat. Assemb. Inter-State Post-Grad. M. A. North America (1939), 1940, pp. 83-91.

tions in volume of any part of these contents, consisting of the three elements brain, blood and cerebrospinal fluid, may occur at times—a decrease or increase in the volume of any one of the three elements is immediately compensated for by reciprocal alterations in the volume of one or both of the remaining elements. Quincke [5] in 1902 showed that one of these component volumes, the cerebrospinal fluid, could be reduced by drainage of this fluid through a spinal puncture performed in the lumbar region. Weed and his co-workers [6] in 1921 discovered the ability of hypertonic solutions injected intravenously to reduce not only the edema of tissues but the amount of cerebrospinal fluid. These doctrines have resulted in two valuable therapeutic measures, namely dehydration and spinal fluid drainage. Both measures have played a major part in reducing brain injury mortality rates.

Dehydration.—The chief criticisms aimed at this method of therapy deal with the dangers of overdehydration, the deleterious effects on the kidneys by the prolonged use of hypertonic salt and sucrose and the tendency to cause a reverse osmosis, especially with dextrose. The ability of hypertonic solutions to withdraw fluid from the body tissues into the blood vessels, thence to be eliminated through the kidneys or bowel, has been proved both scientifically and clinically. When combined with limitation of fluids, the fluid reservoirs of the body may be completely evacuated. Fatalities occur from such excessive dehydration. All these criticisms are valid, but they do not hold water when a careful adequate plan of dehydration is followed only when and if indicated.

Lumbar Puncture.—The authorities writing on craniocerebral injuries during the third decade of this century were divided into two camps: those who favored and those who opposed lumbar puncture. The latter warned the profession against the danger of herniation of the medulla through the foramen magnum —a danger so frequently noted in the presence of brain tumor. Those who favored the procedure advocated spinal punctures as a far safer method of management than the old subtemporal decompression operation. Some of these believed in routine spinal puncture of every patient with head injury admitted to the hospital whether unconscious or otherwise. Others believed only in diagnostic lumbar puncture, chiefly to ascertain the spinal fluid pressure or the presence of a subarachnoidal hemorrhage. Some favored draining only a sufficient amount of fluid to bring the manometer reading to normal or slightly above, thus often removing only 5 or 10 cc. or only 1 cc. if no increased pressure was present. Others, notably Temple Fay, advocated "complete drainage," pointing out that this was the only element of the three component volumes that could be removed. The senior author [7] in his 1931 publication condemned all routine measures and stressed the need of individualizing the treatment. He believed then and has continued to teach that, when the signs and symptoms indicated the need, spinal drainage with removal of 30 to 60 cc. of fluid, if performed early, was life saving. In his experience these indications were present in 33⅓ per cent of all proved skull fractures.

5. Quincke, Heinrich Irenæus: Die Technik der Lumbalpunktion, Berlin, Urban & Schwarzenberg, 1902.

6. Weed, L. H., and Hughson, W.: Systemic Effect of the Intravenous Injection of Solutions of Various Concentrations with Especial Reference to the Cerebrospinal Fluid, Am. J. Physiol. **58**: 53 (Nov.) 1921.

7. Mock, Harry E.: Management of Skull Fractures and Intracranial Injuries, J. A. M. A. **97**: 1430-1436 (Nov. 14) 1931.

Because a few outstanding authorities still condemn spinal drainage, many a general physician and surgeon still fears the procedure. To these we recommend the article written by Rowlette and Weiner [8] in 1941—an article which should convince any surgeon of the value of dehydration and spinal drainage. They give a comparison of the mortality rates in two services at the St. Louis City Hospital. Prior to 1938 all patients with brain injury were treated with a very limited type of dehydration and seldom received a lumbar puncture. A survey of all skull fractures and truly serious head injuries treated from 1934 to 1937 revealed a mortality rate of 38.9 per cent. In 1938 two units were established in the St. Louis City Hospital for the treatment of proved brain injuries. Each unit received every other case in rotation. Unit A continued to treat the skull fracture-brain injury case by no limitation of fluid, a very moderate dehydration and only an occasional spinal puncture. Unit B adopted the most radical dehydration for forty-eight hours and almost routine early lumbar puncture and, when indicated, frequent repeated punctures, with practically total drainage of all the spinal fluid at each tap. The mortality rate for unit A was 37.3 per cent. The mortality rate for unit B was 21 per cent. For the years 1939 and 1940 the combined mortality rate for the two services was 28.5 per cent as compared with the previous high rate of 38.9 per cent.

TABLE 2.—*Major Controversies Concerning Treatment of Craniocerebral Injuries Since 1900*

1900-1910.	Trephining vs. nonoperative treatment
1910-1920.	Subtemporal decompression vs. spinal puncture vs. "do nothing treatment"
1920-1930.	Routine spinal puncture vs. never do a spinal puncture vs. dehydration treatment
1930-1940.	Spinal drainage when indicated vs. routine vs. no spinal puncture Radical vs. mild vs. no dehydration Subtemporal decompressions (10% Dandy) vs. exploratory decompressions (30% Munro) vs. delayed operations for certain definite lesions

Subtemporal Decompression.—This procedure was advocated by Cushing [9] in 1908 for "bursting fracture of the skull." During the decade following his publication the operative rate in skull fractures and brain injuries jumped from 12 per cent to 25 per cent, as indicated by a review of the literature. The originator of this operation ceased doing it except in very selected cases many years prior to his death. In personal correspondence he advocated lumbar puncture as a safer procedure, except in certain instances, when conservative methods proved ineffective. Few of the neurosurgeons writing on this subject of acute brain injuries during the last five years approve this operation. The pendulum swinging from the high operative rates of a decade or more ago has swung so far toward conservatism that many a needed operation today is neglected or delayed too long.

Exploratory Decompression.—This has replaced subtemporal decompression almost completely. Munro,[10] one of the strongest advocates of exploration, stresses the frequency of undiagnosed subdural hemorrhage in head injuries. His operative rate in 1,203 cases was 36.9 per cent. Many of these were undoubtedly late

8. Rowlette, A. P., and Weiner, D. O.: Craniocerebral Injury, Surg., Gynec. & Obst. **72**: 551-556 (March) 1941.

9. Cushing, Harvey: Subtemporal Decompression Operation for the Intracranial Complications Associated with Bursting Fractures of the Skull, Ann. Surg. **47**: 641-644 (May) 1908.

10. Munro, Donald: Craniocerebral Injuries, New York, Oxford University Press, 1938.

cases, the operation being done by a great specialist. Such a high operative rate should not be advocated for the average physician and surgeon treating the acute case.

MANAGEMENT JUDGED BY MORTALITY RATES

Two nationwide surveys of proved or practically proved skull fractures have been made by the senior author covering the years 1928 to 1940. The first survey included the consecutive skull fracture records submitted by approximately one hundred surgeons on a prepared survey sheet and included cases treated from 1928 to 1935. Prior to 1935 the author, assisted by

TABLE 3.—*Survey of 6,262 Consecutive Cases of Proved Skull Fracture*

Years	Total Number of Cases	Total Deaths	Range of Death Rates	Average Mortality
1928-1935	3,156	1,098	25 to 49%	33%
1935-1940	3,106	806	17 to 42%	26%
Totals	6,262	1,904		
Average improvement in death rate				7%

Drs. A. R. Morrow and Charles E. Shannon, surveyed the consecutive skull fracture records for a period of five years in ten hospitals in and adjacent to Chicago. In addition, certain surgeons copied pertinent facts on his survey sheet covering the consecutive five year records in eight other hospitals located in various sections of the country. Thus, the first survey includes the studies of 3,156 consecutive skull fracture records.

The second nationwide survey was started in 1940 in an effort to answer the challenge tossed to the senior author by Dr. Louis Pollock: "Can you prove that dehydration and spinal drainage have played a part in reducing the high mortality rate from brain injuries?" Although an arduous task, this clinical investigation has repaid us and those surgeons participating in it a hundred fold. Drs. John Lindquist, S. R. Snead and F. E. Sarver surveyed the consecutive records from 1935 to 1940 in twelve hospitals, with the consent of their staffs, in Illinois, Wisconsin and Indiana. In addition, certain surgeons filled in our survey sheets from the records of twenty-six other hospitals representing every section of the country. The junior author has assisted in tabulating the accumulated material. The cases from two or three hospitals in medium size cities are combined as though from one hospital. Thus the second nationwide survey covers the 3,106 consecutive records for this period of five years in nineteen hospitals labeled A to S. Table 3 shows the total number of cases studied in each survey and the results of management as gaged by the mortality rates. The improvement in results is encouraging. The duty placed on the junior author is to repeat this nationwide survey in ten years. May he find better and more uniform results as judged by mortality rates.

Standards of observation and of good, average and poor treatment were established in order to compare the management and results thereof among the 3,106 collected cases of this second survey. Each individual case record from each hospital was graded according to these standards. The average of the grades for the total series of cases in each hospital determined the management group to which the hospitals belonged. Table 4 shows the points on which each management group was graded. The mortality rate found in each group justified these grades.

Further analysis of these nineteen hospitals that treated 3,106 consecutive skull fractures during a five year period revealed that these skull fractures were of equal seriousness judged by the relative proportion of linear, basal and combined fractures. The staffs of four of these hospitals so managed 323 cases that the mortality rates ranged from 17 to 21 per cent. The staffs of five so managed 2,033 cases that the mortality rates were 23 to 29 per cent. But the staffs of ten hospitals rendered such poor management in 750 cases that death rates mounted to 30 to 42 per cent. Why this wide divergence in results?

OBSERVATION

If in every case of severe craniocerebral injury one could lift the cranial cap and actually visualize the pathologic changes in the brain and in its blood and cerebrospinal fluid circulations, the management of the case would be simplified and many controversial problems concerning treatment would be solved immediately. But the surgeon viewing the unconscious patient with a severe head injury must depend on the signs and symptoms, rarely stationary, more often showing changes in variety and intensity, if he is to approach even an approximate diagnosis of the pathologic changes inside that skull.

The changeability of the signs and symptoms and the importance of recognizing and interpreting many of these changes is the strongest argument for close observation and charting the course.

The value of close observation is reflected in the mortality rates of the good, average and poor management groups in table 4. The good management group, with a grade of 85 per cent for observation, means that with few exceptions every case record had the blood pressure, pulse, respiration and temperature charted at least every two hours and many as often as every thirty minutes. This "charting of the course" indicates that these surgeons were in control of their cases at all times. The observation grade of 54 per cent in the poor management group represents a far different situation—blood pressure often neglected and pulse, respiration and temperature charted only two or three times a day. Such charting indicates poor navigation.

TABLE 4.—*Good, Average and Poor Management Graded on the Following Points:*

Hospitals Grouped According to Management	Good A to D	Average E to I	Poor J to S
Number of consecutive skull fractures	323	2,033	750
Mortality rates	17 to 21%	23 to 29%	30 to 42%
Observation, average grade	85%	75%	54%
Treatment, average grade	87%	69%	52%
Shock rules observed	85%	70%	45%
Dehydration when used was adequate	95%	74%	36%
Spinal tap when indicated was done early (first 24 hours)	79%	59%	30%
Spinal fluid drainage sufficient (20 to 70 cc.)	80%	47%	18%
Operative judgment good	79%	60%	35%

TREATMENT DURING THE FIRST SIX HOURS

Cerebral shock causes many of the early deaths. Grafted on the condition of ordinary traumatic shock are the manifestations of direct or indirect damage to the vital cerebral centers, thus presenting a definite entity—cerebral shock. Disturbed consciousness, varying from a dazed condition to deep coma, usually accompanies this form of shock. In addition to the ordinary signs of shock, the slowed pulse, slow, shallow respirations and low blood pressure, especially a low diastolic pressure, indicate the presence of cerebral shock. The signs and symptoms of the cerebral damage may overshadow the shock picture from the onset.

Thus a few patients pass rapidly from delirium to the deepest coma; the respirations increase rapidly or change to a Cheyne-Stokes variety; the pulse pressure becomes considerably increased and the temperature jumps rapidly from 100 to 106 F. or more. Death may occur within a few minutes to a few hours. These patients present the picture of inevitable death and do die if "do nothing treatment" is followed, yet certain ones of these may be saved by proper management. In the majority of cases the shock picture predominates for the first one or two hours, when it slowly changes into the picture of cerebral damage. When severe associated injuries are present, the shock combined with the cerebral manifestations is often very profound. The wise surgeon will treat every head injury patient the first one or two hours after admission as one having potential cerebral shock regardless of associated injuries, except the 1 or 2 per cent who may have life threatening hemorrhages. The tendency to minimize the importance of shock is dangerous teaching.

After reviewing thousands of records, we believe that the most dangerous period of cerebral shock is approximately the first six hours. The records in the better managed cases indicate that an average of one third of all the deaths occur in this period. If the following rules concerning the management of the average skull fracture-brain injury case during the first six hours were adopted for every head injury, mild to severe, the higher mortality rates throughout the country would be reduced 25 to 50 per cent.

1. Transfer patient from stretcher to bed, place between blankets and apply heat.
2. Roentgenograph every head injury but never in the presence of cerebral shock.
3. Do nothing which adds insult to injury. Suturing of scalp wounds or other wounds, reducing associated fractures or immediate operations are added insults which can be delayed with few exceptions.
4. Don't transfer patient from ward to a more desirable room or to another hospital.
5. Avoid oversedation. Don't give morphine—morphine masks the picture and adds to respiratory depression.
6. Stimulate if necessary but don't depend on stimulants and sedation as sole treatment.
7. Dextrose or sucrose, 50 cc. of 50 per cent solution intravenously, is the best means of restoring blood volume in shock. Use an additional 200 to 300 cc. of isotonic solution of sodium chloride intravenously if indicated. Overcoming the shock, not dehydration, is the sole purpose here.
8. Blood plasma or blood transfusion should be used if shock is profound or hemorrhage from associated injuries is present.
9. Oxygen will tide many a patient over this dangerous six hour period.
10. Postural drainage or the use of an aspirator is always indicated when the air passages are obstructed.
11. Antitetanus, antigas and other preventive serums may add the additional insult. Use after the first six hours when indicated.
12. Watch and record pulse, respirations and blood pressure every thirty minutes to one hour, and temperature every one to two hours; observe changes in pupils and reflexes and watch for focal signs. In no other way can one chart the course and guide subsequent treatment.

The breaking of these rules was noticed with increasing frequency as one reviewed the records from the good to the poorly managed cases. The immediate suturing of the scalp wounds, often with the patient dying within one or two hours, was not infrequent. The rule concerning the delayed roentgenographing of the skull usually was observed in the good management group while frequently broken in the other two groups. Associated injuries seemed to hasten the x-ray procedure. Instead of having the fractured extremity protected with some form of temporary splinting, several patients were transferred immediately from the emergency room to the x-ray laboratory. In such instances not only the suspected extremity but the skull invariably was roentgenographed. If one feels compelled to ascertain the nature of a skull fracture or its possible location over the middle meningeal arteries, a portable x-ray machine should be used. Otherwise x-ray examination can be delayed for days.

Major procedures such as the reduction of a fractured femur or humerus or the amputation of a crushed extremity, as well as the minor procedures of suturing lacerated wounds, are definitely contraindicated in cerebral shock and especially in the presence of profound shock accompanying associated injuries. The exception to this rule may be the occasional ruptured viscera with its life threatening hemorrhage. Painful experience and a review of these records prove this statement.

Oxygen may tide many a patient over this dangerous first six hour period. With continued unconsciousness and with the gradual development of cerebral ischemia and anoxia, oxygen is always indicated. Never delay its use until it is attempted as a final resort.

Stimulants are indicated at times to meet extreme symptoms. In many a case record in the poor management group these combined with sedation constituted the sole treatment. Of all the stimulants used, caffeine ranked first. In the presence of severe shock, caffeine with sodium benzoate is our choice of stimulants; in the presence of persistent low blood pressure we rely on neosynephrin. Atropine or nikethamide may be indicated when respiratory failure is threatened.

The immediate use of preventive serums was noted in many charts even when the signs and symptoms indicated probable inevitable death. We delay the use of these until the end of twenty-four hours, fearing that even their slight insult may tip the scales against the patient during this critical period. Several of the charts showed the administration of antimeningococcus serum, although it is known that the pneumococcus is the offending organism far more frequently than the meningococcus. In the last two or three years sulfonamide derivatives appear frequently in the records as a prophylactic measure. The incidence of meningitis in the collected series was 1 per cent. There may be an occasional case requiring such preventive measures, but we doubt the value of their routine use.

SEDATION

What is one to do for the extremely restless or delirious patient or for the severe headaches so frequently complained of? Sedation may relieve this situation temporarily, but beyond a question of doubt it increases the death rate. The swelling and compression of the component elements inside the skull, referred to as increasing intracranial pressure, account for these signs and symptoms. They can be relieved often permanently by the intravenous injection of 50 cc. of 50 per cent dextrose or sucrose or by the drainage of 30 to 60 cc. of spinal fluid. Delay of their use until medullary compression is established accounts for their ineffectiveness.

Reviewing each individual record when sedatives were used in each of the three management groups revealed that morphine invariably increased the mortality rate over the normal rate for that particular group. Thus, in hospitals A to D morphine was used in 2 to

21 per cent of the cases. The gross mortality rates in this group varied from 17 to 21 per cent, while the mortality rate among their patients receiving morphine was 25 per cent. Compare this with hospitals J to S, where morphine was used in 30 to 82 per cent of their cases. The gross mortality rates in this management group varied from 30 to 42 per cent, while the mortality rates among the patients receiving morphine varied from 36 to 50 per cent.

If not used too often or not too large doses and especially if not combined with morphine, the following drugs in the order named seemed to have the least deleterious effects: barbiturates, codeine, paraldehyde, chloral or chloral and bromides.

TABLE 5.—*Mortality Rates in Oversedation*

Group	Per Cent Oversedation	Death Rate for Group	Death Rate in Oversedation
Good management	3%	17-21%	25%
Average management	7%	25-29%	38%
Poor management	13%	30-42%	49%

Table 5 indicates the effect on the mortality rate whenever oversedation was present. It was noteworthy that those surgeons who used sedatives early usually continued their use. Combined with neglect of good therapeutic measures, sedation is especially malignant.

TREATMENT AFTER SIX HOURS

Much that has been said relative to the management of the brain injury case during the first six hours applies during the subsequent hours and days. The only routine rules applicable to these patients as a class are:

1. Conserve the patient's strength. Feeding must not be neglected. If the patient is unconscious or won't eat, start stomach feedings with a diet similar to No. 1 or No. 2 ulcer diet certainly not later than forty-eight hours after admission. Continue to avoid undue moving and all unnecessary measures which may add insult to injury.

2. Maintain a fluid balance compatible with life but don't push fluids unless the frailty of the patient, excessive perspiration or some associated injury, for example a severe burn, demands more than the normal intake. In such instances it may be necessary to counteract the overdehydration by more frequent spinal punctures. If the condition of the patient warrants limitation of fluids to as low as 1,000 cc. for the first twenty-four or forty-eight hours, it would be wise to increase this to 1,500 to 2,000 cc. thereafter in order to maintain body fluid balance. An average intake of 1,500 to 2,000 cc. is safe and applicable to most patients.

3. Charting the intake and output is exceedingly important but quite difficult when incontinence is present. Blood chemistry, especially observing the blood sugar and blood chlorides, should not be neglected and, when abnormal, should be controlled.

4. Early urinalyses and blood counts are essential, and "charting the course" implies continued observation of these. Do serologic tests on the cerebrospinal fluid whenever obtained.

5. Every unconscious patient must be closely observed for retention of urine and, if it is present, catheterization is necessary; if persistent, tidal drainage may be indicated. A distended bladder accounts for the extreme restlessness presented by many of these patients.

6. Daily bowel movements are essential and, if dehydration by hypertonic dextrose is being practiced, several bowel movements per day will prevent the dangers of a reverse osmosis.

All treatment directed toward the increased intracranial pressure or other specific brain damage must be individualized. The signs and symptoms of each individual case suggest the possible craniocerebral pathologic condition present and the line of treatment indicated. Patients do not all need dehydration or spinal punctures, and certainly all patients do not need operative management.

As early as 1931 the senior author classified his skull fracture-brain injury cases into four treatment groups as indicated by the signs and symptoms which influenced the type of treatment given. In analyzing these 3,106 cases they were likewise grouped according to the treatment given. The plan of placing each case in one of the four treatment groups has enabled us to compare the results of the various methods of management as judged by their mortality rates (table 6).

GROUP 1

Mild concussion is the pathologic condition suggested by the signs and symptoms in group 1. There may be mild shock combined with a momentary loss of consciousness or only a short period of being dazed, confused or semistuporous. The x-ray examination reveals a skull fracture, or a short period of bleeding from one of the orifices indicates a basal fracture.

The treatment consists of rest in bed only for a minimum of two weeks. Rest treatment only is absolutely contraindicated when patients later develop signs and symptoms demanding more drastic treatment. No patient should die in group 1. Table 6 shows entirely too many patients receiving no other form of management but rest in the average and poor management groups. Twelve of their patients died in group 1. Reviewing the charts of these disclosed that early institution of proper management should have saved at least 10, thus reducing the mortality rates of these two management groups materially.

GROUP 2

Severe concussion or mild contusion probably with microscopic lacerations and petechial hemorrhages or with localized swelling or edema or with a less pronounced generalized edema, all giving a certain degree of increased intracranial pressure, constitutes the pathologic lesions indicated by the signs and symptoms of the patients who remain in group 2 throughout the course of their treatment.

TABLE 6.—*Comparative Results of Good, Average and Poor Management*

Hospital	No. of Cases	Group 1, Rest Only	Group 2, Dehydration	Group 3, Spinal Puncture	Group 4, Operation	Death Rate
Author	561	6%	50%	35.5%	8.5%	16.8%
Good A to D	323	2% to 18% Average 9%	11% to 62% Average 36%	18% to 80% Average 50%	4% to 7% Average 5.5%	17% to 21%
Average E to I	2,003	3% to 18% Average 11%	42% to 70% Average 56%	14% to 39% Average 28.5%	4% to 25% Average 10%	25% to 29%
Poor J to S	750	3% to 32% Average 16%	10% to 72% Average 51%	10% to 44% Average 22%	3% to 30% Average 9.5%	30% to 42%

The incidence of proved skull fractures remaining in group 2 was 50 per cent in our cases and 36 per cent in the good management group. The latter group resorted to lumbar puncture 14 per cent more frequently than did ours. Reference to table 4 indicates the inadequacy of the dehydration methods in the average and poor management groups.

Group 2 treatment includes therapeutic measures varying from shock treatment, mild sedation or stimulation to the most drastic dehydration and supportive management. The need for each procedure is gaged

by the signs and symptoms of the individual patient. Let us assume that the average patient has received his 50 cc. of 50 per cent dextrose to help overcome shock. If some form of disturbed consciousness is still present, if the pulse and respirations remain slow or have a tendency to increase, if the diastolic pressure drops to 60 or below or if restlessness is the chief sign or headache the chief symptom, the 50 cc. of 50 per cent dextrose is repeated in three to six hours, combined with 4 ounces (120 cc.) of 50 per cent magnesium sulfate by rectum. If the symptoms and signs disappear, no further dextrose is administered although magnesium sulfate by rectum is continued for two or more days to prevent recurrence of increased intracranial pressure. If such signs persist but are not too prominent the dextrose-magnesium sulfate therapy may be repeated in six or twelve hours and thereafter only as indicated by the signs and symptoms.

In a review of the hospital records it was evident that many surgeons routinely order 50 cc. of 50 per cent dextrose or sucrose every six hours or twice a day and continue this indefinitely regardless of the signs and symptoms. This is abusive use of these otherwise valuable agents. Again, many of the records in the average and poor management groups showed some form of dehydration used in a "hit or miss" manner regardless of indications. Frequently the hypertonic solutions were not started until the second day and were then persisted in until the patient died, although the signs and symptoms long since suggested the need of spinal drainage. These faulty inadequate methods rather than dehydration per se should be condemned.

Among the collected cases in which hypertonic solutions were employed intravenously, 50 per cent dextrose was the choice in 82 per cent against 18 per cent for sucrose, indicating the choice of the profession. Magnesium sulfate by mouth or by rectum was often the sole dehydrating agent. Ten per cent magnesium sulfate solution intravenously was used in 0.5 per cent and intramuscularly in 1 per cent of the cases. Most of these cases were fatal. Oldberg [11] has been especially vehement in condemning magnesium sulfate intravenously.

The use of concentrated serum has been suggested as the newest dehydrating agent in brain injuries. J. W. A. Turner [12] has reported on this method as used among the British wounded soldiers.

Several recent articles indicate a growing tendency to depend on 50 per cent magnesium sulfate in 4 ounce doses by rectum or through a Levine tube as the only dehydrating agent used. If this fails to relieve symptoms an early lumbar puncture with spinal drainage is advocated.

GROUP 3

Severe contusions, lacerations and hemorrhage, usually involving directly or indirectly the more vital centers of the brain, are the pathologic lesions suggested by the signs and symptoms of those patients who sooner or later fall into group 3 treatment. One must now think in terms of the three elements inside the bony cast the skull. The brain swells (whether this is a true edema or otherwise is an academic question); the changed physiologic mechanism causes an increase in the amount of cerebrospinal fluid; the pressure outward of these two elements against the bony cast reduces inflow of arterial and outflow of venous blood. The presence of a depressed fracture or of hemorrhage may further alter the volume of one or the other of these three elements. If these pathologic changes are allowed to persist, death will follow from a compression of the vital centers in the medulla; or the overweight of the swollen brain will push its stem through the only orifice for escape, the foramen magnum—a form of herniation more to be feared than one from a spinal puncture.

The earliest possible relief of the cerebral edema, anoxia and especially the suppressed circulation is the aim of treatment. Dehydration will limit and reduce a certain amount of the cerebral edema. Oxygen will overcome some of the cerebral anoxia. Spinal drainage of a sufficient amount of fluid, usually bloody, to make more room for the entrance of arterial and the escape of venous blood is the only method left to relieve the severe ischemia. All three modalities are indicated in this extreme picture of brain injury. Doing a lumbar puncture as a last resort begets failure.

TABLE 7.—*Treatment in Five Hospitals*

Source	No. of Cases	Gross Death Rate	Per Cent Per Cent Lumbar Punctures	Per Cent Punctures First 24 Hrs.	Average Amount Fluid Drained	Death Rate in Group 3
Authors	261	16.8%	35.5%	84%	40 cc.	17.6%
Hospitals A and B	184	18.5%	70 %	80%	40 cc.	21 %
Hospital H	1,342	28.4%	32 %	60%	28 cc.	37 %
Hospitals R and S	112	41 %	19 %	20%	7 cc.	78 %

Certain spinal puncture axioms have been published by the senior author; for example:

1. The earlier spinal puncture is performed, when indicated, the lower the death rate. Regardless of the manometer reading a sufficient amount of spinal fluid must be drained to relieve, if only temporarily, the ischemia.

2. Spinal puncture is rarely indicated during the shock period, but there are occasional exceptions to this rule.

3. Repeating spinal punctures and neglecting operation when definitely indicated increases the death rate.

4. Dehydration methods continued after a spinal puncture is performed often obviates repeating punctures; but do not raise the blood volume too soon after drainage.

Table 7, which includes a more detailed study of five hospitals representing each of the management groups and our cases, graphically illustrates the truths of these axioms.

Indications.—When to use spinal drainage and when to repeat the procedure depends altogether on the persistence of the signs and symptoms or their increasing severity. To judge these requires the closest observation. These indications are:

1. If the unconsciousness persists, if restlessness, delirium or convulsions, twitchings or spasticity appear and persist or grow worse, early spinal drainage is indicated. Repeat the procedure any time thereafter when the recurrence or the persistence of these conditions indicate, certainly within eight to twelve hours.

2. If, in spite of attempts at relief with dehydrating agents, the diastolic pressure remains persistently low or the systolic pressure becomes erratic and the pulse pressure persistently climbs above 65, spinal drainage should be done without further delay. High blood pressure prior to the injury may confuse these signs.

3. If the pulse and respiration are persistently rapid, especially following a period of slowed pulse and respiration, or if Cheyne-Stokes respiration develops, do not depend on dehydration but turn to spinal drainage.

11. Oldberg, Eric: Treatment of Increased Intracranial Pressure, Proc. Internat. Assemb. Inter-State Post-Grad. M. A. North America (1939), 1940, pp. 106-110.

12. Turner, J. W. A.: Concentrated Serum in Head Injuries, Lancet 2: 557-558 (Nov. 8) 1941.

4. If focal signs develop or if the signs and symptoms persist or grow worse in spite of spinal puncture and especially if xanthochromia persists in the spinal fluid, suspect extradural or subdural hemorrhage and strongly consider the advisability of exploratory decompression.

GROUP 4

The pathologic conditions suggested or actually seen in this treatment group consists of (1) Definitely depressed skull fractures, simple and compound, (2) extradural hemorrhage, (3) subdural hemorrhage or subdural collection of fluid—often persistent late signs, (4) brain abscess—a rare and late development—and (5) persistent dural leaks—a rare operative indication.

The incidence of the aforementioned pathologic conditions in proved skull fractures varies from 15 to 20 per cent as judged by the clinical and autopsy findings in the collected cases. Many of these patients died within the first few hours. The extensiveness of the lesions or the immediate critical outlook indicated that the condition of between 5 and 10 per cent of the patients in this group could not be considered operable. Experience has taught that immediate or first few hour operations are rarely successful. The incidence of operability in group 4 is probably between 7 and 10 per cent.

The study of all the collected records showed many patients with definite signs of extradural or subdural hemorrhage, treated by dehydration or spinal drainage, who lived more than twenty-four hours but never received the benefit of exploratory decompressions. Several patients with depressed skull fractures died without operation. Many have stressed the importance of delaying operative procedures on depressed skull fractures. It should be emphasized that a certain percentage of these depressed fractures have a large blood clot beneath them and, when the signs and symptoms indicate the need, these must be operated on early, the operation seldom being necessary within the first twelve to twenty-four hours. The remaining depressed fractures can await the safer period of days or weeks before operation is performed. Many slightly depressed fractures, especially if located away from motor areas, may never require surgery.

Several of the compound depressed fractures, some with escape of brain substance, were operated on immediately, as shown by the case records. The majority of the patients died. In the presence of profound cerebral shock it is far wiser to cover these terrific compound fractures with sterile dressings firmly bandaged and strive to save the patient's life rather than follow a more or less routine teaching to the effect that compound skull fractures demand immediate operation. The majority of these should be thoroughly cleansed and a thorough débridement done with a minimum of necessary reparative work sometime within the first twenty-four hours. Govern the time and extent of operation by the patient's chances of recovery, not by any fixed rules.

The reaction against the promiscuous trephinings and subtemporal decompressions of two decades or more ago has been so great that we are in danger of the pendulum swinging too far toward conservative nonoperative treatment. Operative rates as low as 4 per cent, found in many of the hospital series studied, increase the mortality rate almost to as great an extent as operative rates as high as 20 to 25 per cent, found in the records of two of the hospitals.

CONCLUSION

1. Two surveys were made of the management of skull fractures and brain injuries throughout the profession, covering 6,544 consecutive cases collected from all sections of the country. The study of these records combined with our experience in 487 personal cases strengthens our convictions concerning the value of moderate dehydration, spinal drainage when indicated and the definite need of operations in approximately 8 per cent of all skull fractures.

2. The management of acute brain injury will always be a problem for the general physician and surgeon. The widespread distribution of this trauma and the fact that of all those dying 47 to 64 per cent die within the first twenty-four hours explain this fact.

3. Comparing the first nationwide survey of records collected from 1928 to 1935 with the second nationwide survey covering the five year period 1935 to 1940 shows an average reduction in mortality rates of 7 per cent in the latter. Certain hospitals previously surveyed showed as much as 50 per cent reduction in their death rates.

4. The observance of rules and indications for management of brain injury cases will, in our opinion, reduce the higher mortality rates 25 to 50 per cent. Examples of poor management drawn from hundreds of the collected charts substantiate this statement.

5. It is hoped that this clinical investigation will disperse the confusion concerning management that exists in the minds of many surgeons seeing only occasional cases of brain injury.

122 South Michigan Avenue.

ABSTRACT OF DISCUSSION

Dr. Max M. Peet, Ann Arbor, Mich.: On many controversial points I am in agreement with the authors. I teach my students that we have certain general principles in the treatment of head injuries, but no rules. I feel that every case should be considered individually. It is impossible in the treatment of skull fractures with a wide variety of brain injuries associated with them to lay down any hard and fast rule. A most important factor in the treatment of acute head injury is immediate clearance of the air passages. Many of these patients come in with pulmonary edema already developed or they have been vomiting and there is vomitus in the pharynx, sometimes down into the trachea. The most important immediate treatment is clearance of the air passages, and one can do that quickly by dependent drainage. Bring the patient clear over the end of the bed, irrespective of his general condition. Then further drainage can be kept up by aspiration. Comparatively few of our patients are in shock when they come in. I agree with the authors that when shock is present it should be treated, probably by blood transfusion. I think that is the most efficient method. I do not believe in taking roentgenograms immediately. Many patients do not have them until they are ready to go home, when the x-ray examination is made largely for a matter of record and possible medicolegal complications. The line of immediate treatment is not going to be influenced by any x-ray examination. Spinal drainage at times is a life saving measure. I have performed spinal drainage immediately on a patient being admitted when I thought that the respiratory system was failing rapidly. Immediate relief of intracranial pressure may save a life. I have done many a spinal drainage within ten minutes, perhaps, of the time the patient received his skull fracture. Seldom does one have that opportunity, but at times it is a life saving procedure. But remember that many patients with head injuries are restless because they have not urinated. A full bladder can cause just as much restlessness in an unconscious patient as in one who is conscious. Time and again I have seen patients who were difficult to control quieted at once by catheterization. When the patient is in good

condition, I believe in x-ray examination. The patient should always be examined carefully for associated injuries, which so frequently are missed because a skull fracture attracts more attention. One should therefore consider each case individually, watching, and operating only when there are definite indications. I never do subtemporal decompression simply to relieve increased intracranial pressure, but if this patient comes in with a weak arm and examination in another hour or two hours or the next day shows that that arm is now paralyzed I believe that exploration of the opposite side is indicated. I watch the pupils very carefully. The mortality can be lowered if we follow these general principles.

DR. FRED M. DOUGLASS, Toledo, Ohio: This presentation does not dispute the argument that the specialty of brain injuries is best served by specialists in that area of medicine. But it does recognize one central fact, that supply and demand in this specialty do not balance. There are far more cases of brain injury than the existing specialists could possibly handle within the sharp time limits so well defined by the authors. It follows that, when a specialist is not available, some one else will have to do the best he can. This will be the situation in about 90 per cent of the cases. In undertaking this paper the authors have been moved by a point of view which to me lies near the very soul of medicine. Facing the unavoidable, medicine is never content with reasonable results. It covets the very best results. The Mocks are speaking to the physician who may have to care for a case of brain injury regardless of his personal preferences. They give us a concise program to raise the average level of care and they prepare the way for rising standards beyond that point. The paper defines a cleancut path for the general surgeons and the hospital surgeons—the men who will have to see the great bulk of the brain injury cases. The paper does not need comment so much as it needs circulation. A copy of it should be in the hands of every physician who believes that every inch of the battle for any patient's survival should be hotly contested.

DR. A. S. LEVEN, Chicago: Injuries of the skull and the brain give the industrial surgeon plenty of headaches, because such injuries nearly always produce complications wherein the etiologic relationship of trauma to cerebral disorders is a most difficult problem. The severity of the initial head injury is no index of the outcome of the case. Some patients with severe skull fractures with bleeding from the orifices and unconscious for days may completely recover. On the other hand, I have seen patients with slight blows on the head present symptoms of intracranial injury and immediate death. Furthermore, a trivial injury or blow to the head may set in motion neurologic and neuropsychiatric manifestations that may culminate in permanent disabling effects. The normal pressure of the cerebrospinal fluid is 5 to 9 mg. on the mercurial manometer. If it rises over 12, a definite pathologic pressure exists. The measurement of intraspinal pressure is more important in the diagnosis of intracranial pressure than is the presence of blood in the spinal fluid. The early history of a head injury, even though corroborated by roentgenograms showing skull fracture, is not of major importance and should not be stressed to the exclusion of evidence of a pathologic basis for final symptoms, and it is not a basis for reaching an appraisal of permanent disability resulting from such injury. While we must appreciate the relative weight of facts in the case, we must be guided only by the conditions actually present caused by the trauma. The development of a cranial injury follows no straight pattern or course.

DR. F. M. SUMMERVILLE, Oil City, Pa.: Now the surgeons of this country have the last word in brain injury and skull fractures. Dehydration properly done there is no question about, but if improperly done there is a question. A patient with skull fracture and head injury came to our service in the early days of dehydration. His entire face was edematous, we could not see the eyes, the lips were protruding, and the nose and cheeks were greatly enlarged. Dehydration was started in the evening, and later in the night he was given a large dose of 50 per cent dextrose solution. The next morning the swelling in the face had entirely disappeared but the patient died as a result of too rapid dehydration. If one can dehydrate the outside of the skull to this extent one can dehydrate the inside of the skull. We do a lot of spinal punctures; do them early, and do them late if necessary. If the plan laid down by the Mocks is followed carefully the death rate in many hospitals can be reduced as much as 50 per cent. We have a comparatively large number of head injuries and skull fractures in our hospital and the death rate is small as contrasted to what we previously had.

DR. HARRY E. MOCK, Chicago: Dr. Peet mentioned the importance of the dilated pupil. In our series of cases 50 per cent had neither a spinal puncture nor an operation, and yet 17 per cent of these showed a dilated pupil on one side—a sign which gradually disappeared. In the 3,106 consecutive skull fracture records collected and studied, a dilated pupil was recorded in 18 per cent of the cases, yet the great majority of these were not surgical cases nor was operation indicated. I am sure that Dr. Peet will agree that when other definite indications for operation exist the unilateral dilated pupil is very suggestive of the site for operation. The time when death occurs following the skull fracture and brain injury is enlightening and teaches many lessons. In the ten hospitals which made up the poor management group, with lack of close observation and often late attendance on the patient, 45 per cent of the deaths occurred in the first twenty-four hours. In the good management group 64 per cent of the deaths occurred in the first twenty-four hours. In our own series, of those dying 64 per cent of the deaths occurred in the first twenty-four hours and 60 per cent of that number of deaths occurred in the first six hours. When there is good management fewer patients will die after twenty-four hours, thus raising the early death rate. These figures indicate that we must concentrate on the management of cerebral shock, the handling of associated injuries and the other conditions which cause these first twenty-four deaths, if the mortality rates are to be lowered. These figures also indicate that brain trauma will always be the problem of the general physician and surgeon. Even if we had a sufficient number of neurosurgeons to go out to the hamlets, villages and cities where a great majority of these skull fractures occur, they would not be able in most instances to arrive there during this dangerous first six hour period. Therefore the full responsibility for reducing the mortality rate in skull fractures throughout the United States falls on all of us, but especially on the general physician and surgeon.

The Surgeon and Air Raid Injuries.—Whatever tends to facilitate the rapid admission to hospital of air raid casualties contributes to the more favorable outcome of the treatment, and thus, since it is believed that some 40 per cent of cases need immediate operation, it is essential that there should be no hindrance whatever to the immediate admission to hospital. . . . The surgeon who is dealing with these cases should have an exact knowledge of the therapeutic outlook, and a sound technic. In addition, precise and orthodox surgical methods will be required of him. He has no right to hesitate. He has to decide in a few moments on the life and future of the wounded, often under unheard of conditions of overwork and fatigue. He cannot regulate the events of even the next hour for himself or his patient. He has to act quickly and choose at once the safest and best operation. To him all wounds are alike: they are recent and appear aseptic, yet grave danger threatens. It is his duty to intervene, not in consequence of existing clinical indications of sepsis, but solely because of the probability of its advent, so that the wounded may be evacuated without danger as quickly as possible. He knows that amongst those who are brought to him there are none whose wounds are negligible, and that the patient who to all appearances is scarcely touched may tomorrow have a grave osteomyelitis, a spreading cellulitis or a gas gangrene. Experience has taught him that if he sends away men whose wounds have not been cleaned up or have been incompletely cleaned, some of them, after a few hours journey, will have to undergo amputation and others will die. It is his clear duty to prevent these results by practicing a rigorous prophylaxis in all cases without distinction, and his surgical sense ought to be such that it is governed automatically by the desire to preserve the patient's life, his limb and its function.—Mercer, Walter, The Immediate Treatment of Air Raid Injuries, Including the Surgery of the Upper Limb, from War and the Doctor, edited by J. M. Mackintosh, M.D., Baltimore, William Wood & Co., 1942.

PATHOLOGY AND PATHOGENESIS OF HUMAN POLIOMYELITIS

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CINCINNATI

Our knowledge of the pathology and pathogenesis of human poliomyelitis has developed slowly over a period of many years, and most of the present day concepts are still so young that they have not yet influenced to any appreciable extent studies on the pathologic physiology of the disease. The present discussion will deal with three major questions: 1. What are the essential lesions of the disease and where are they located? 2. How extensive must those lesions be to produce the paralytic disease and what is the basis for the transitory character of some of the paralysis? 3. What determines the special localization and distribution of the lesions?

The earliest students of the disease [1] were able to prove that the major pathologic change was in the central nervous system, and no scientific investigator has as yet found any evidence to the contrary. Although it had been suspected by some keen observers [2] from the very beginning, it was not until 1929 [3] and thereafter [4] that satisfactory evidence was adduced that the primary attack in the nervous system was on susceptible neurons and that the inflammatory reaction was the result rather than the cause of the neuronal damage. In monkeys killed at various stages during the experimental disease produced by a highly virulent and adapted virus it has been possible to establish a definite sequence of events—a sequence that is found duplicated in human beings when suitable material is studied. The series of photographs reproduced in figure 1 illustrate the fate of a fully susceptible anterior horn cell attacked by a highly virulent virus. At *a* is shown the essentially normal appearance of the cell which was generally prevalent three days before the onset of paralysis. Cells showing diffuse chromatolysis and sharply outlined, acidophilic, intranuclear inclusions (fig. 1 *b*) generally have been found one or two days before the onset of paralysis. The process then progresses to complete acidophilic necrosis of the cell (fig. 1 *c*) and invasion of polymorphonuclear leukocytes (fig. 1 *d*), which ultimately arrange themselves over the dead neurons to form the typical focus of neuronophagia (fig. 1 *d*). After several days the polymorphonuclear leukocytes disappear and their place is taken by glial cells. This series of changes may be taken to represent the pathologic unit of poliomyelitis, and the resulting clinical signs may be regarded as depending on the number and location of neurons so affected. Associated with this there is usually also an interstitial and perivascular infiltration with cells which vary with the stage of the disease, many polymorphonuclear leukocytes being present early and mononuclear and glial cells

TABLE 1.—*Regions of Central Nervous System Most Frequently Affected in Human Poliomyelitis*

1. Spinal cord and posterior root ganglions
2. Medulla—vestibular nuclei, reticular formation and nuclei of various cranial nerves
3. Cerebellum—roof nuclei (fastigia and dentate) and vermis (hemispheres negative)
4. Midbrain—periaqueductal gray, tectum and tegmentum
5. Thalamus
6. Hypothalamus
7. Globus pallidus
8. Motor cortex—especially area 4 of Brodmann

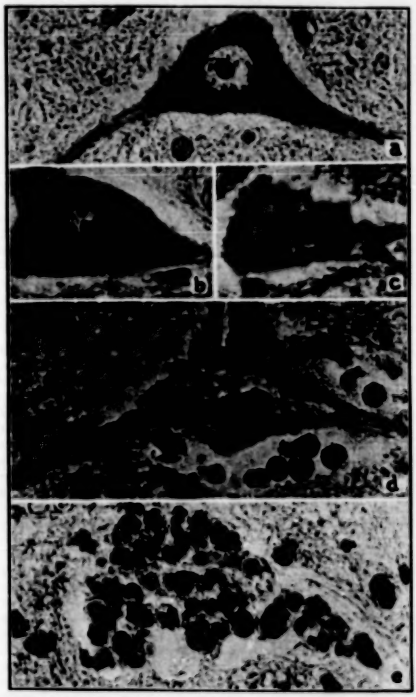

Fig. 1.—Fate of anterior horn cell attacked by highly virulent poliomyelitis virus: *a*, essentially normal cell; *b*, chromatolysis and acidophilic, intranuclear inclusions; *c*, complete acidophilic necrosis; *d*, polymorphonuclear leukocytes invading necrotic cell; *e*, neuronophagia by polymorphonuclear leukocytes. Reduced from a photomicrograph with a magnification of 1,000 diameters, which originally appeared in the Journal of Experimental Medicine.[9]

Personal work discussed in this paper was aided by a grant from the National Foundation for Infantile Paralysis, Inc.

From the Children's Hospital Research Foundation and Department of Pediatrics, University of Cincinnati College of Medicine.

Owing to lack of space, this article has been abbreviated here by omission of several illustrations. The complete article appears in the author's reprints.

Read in the Panel Discussion on Poliomyelitis at the joint meeting of the Section on Nervous and Mental Diseases and the Section on Orthopedic Surgery at the Ninety-Third Annual Session of the American Medical Association, Atlantic City, N. J., June 12, 1942.

1. Cornil, V.: Paralysie infantile; autopsie: alteration de la moelle épinière, de nerfs et des muscles, Compt. rend. Soc. de biol., 3 série **5**: 187, 1863. Prevost, J. L.: Observations de paralysie infantile; lésion des muscles et de la moelle, ibid., a série **2**: 215, 1865. Charcot and Joffroy.[2] Rissler.[3]

2. Charcot, J. A., and Joffroy, A.: Cas de paralysie infantile spinale avec lésions des cornes antérieures de la substance grise de la moelle épinière, Arch. de physiol. **3**: 134, 1870. Rissler, J.: Zur Kenntniss der Veranderungen der Nervensystems bei Poliomyelitis anterior acuta, Nord. med. ark. **20**, No. 22, 1888.

3. Hurst, E. W.: The Histology of Experimental Poliomyelitis, J. Path. & Bact. **32**: 457, 1929.

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predominating later. The cells present in the meninges actually represent an overflow from the perivascular spaces and are thus secondary to neuronal damage rather than the result of a true meningitis. The so-called signs of meningeal irritation, including the familiar spasm of the muscles of the neck and back, therefore, are more properly regarded as the earliest signs of neuronal damage than the result of a true meningitis.

The next series of illustrations is intended to show the extent of neuronal destruction that may be found in the lumbar cord of human beings with different types of involvement terminating at various intervals after onset. Figure 2 represents an essentially normal anterior horn from a bulbar case with initial palatal and pharyngeal involvement terminating within twenty-four hours after onset of paralysis. Although extensive lesions were present in the medulla and the cervical cord was moderately affected, the process had not yet reached the lumbar cord. Figure 3 is also derived from

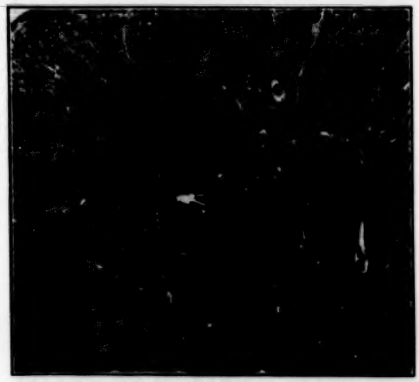

Fig. 2.—Essentially normal anterior horn of lumbar cord of a rapidly fatal human case of bulbar poliomyelitis. Note large number of neurons and compare with figures 3, 4 and 5. Reduced from a photomicrograph with a magnification of 36 diameters.

a bulbar case of somewhat longer duration, and one may note that, while most of the anterior horn cells are still intact, there are many foci of neuronophagia and some interstitial and perivascular infiltration. It was this type of picture, in which completely destroyed neurons are found side by side with intact, apparently unaltered, ones that suggested to some of the earliest observers that neuronal damage was not due to the edema and exudate of the inflammatory reaction. Figure 4 is from a patient with initial paralysis in the extremities and shows destruction of practically all the anterior horn cells with only a few remaining foci of neuronophagia to indicate the sites formerly occupied by neurons. Figure 5 shows the complete disappearance of almost all the neurons without even foci of neuronophagia to indicate their former sites; this lumbar cord was derived from a patient who died four days after initial paralysis of the intercostals and extremities. Although the lesions are more severe and extensive in the anterior horns of the spinal cord, the posterior horns are not altogether spared, and the dorsal root ganglions almost invariably show destruction of varying numbers of sensory neurons. Figure 6 shows multiple foci of neuronophagia and interstitial cellular infiltration in a human dorsal root ganglion. It may be noted parenthetically that the pathologic changes shown in figures 2 to 6 were all

Fig. 3.—Anterior horn of lumbar cord from a case of human bulbar poliomyelitis. Note many foci of neuronophagia (arrows) side by side with many essentially normal neurons. Note also perivascular and cellular infiltration. Reduced from a photomicrograph with a magnification of 36 diameters.

present in patients from whom the virus of poliomyelitis was isolated by monkey inoculation.

Up until very recent years the attention of clinicians interested in poliomyelitis was focused almost exclu-

Fig. 4.—Anterior horn of lumbar cord from a case of initial spinal paralysis. Note destruction of all anterior horn cells and few remaining foci of neuronophagia (arrows). Reduced from a photomicrograph with a magnification of 36 diameters.

sively on the spinal cord and medulla. Since 1929, however, when it was recognized that the motor cortex may be affected with some regularity,[5] increasing atten-

5. André-Thomas and Lhermitte, J.: Les lésions cérébrale et médullaires de la poliomyélite aiguë de l'adulte, Rev. neurol. **36**: 1242, 1929. Hurst.[3]

tion has been paid by pathologists to the remainder of the central nervous system. Table 1 shows the regions in which neuronal lesions have been found most frequently in the human central nervous system. Of particular importance to a proper reinvestigation of the pathologic physiology of the disturbances of muscle

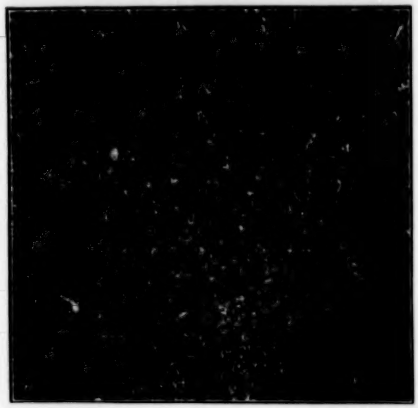

Fig. 5.—Anterior horn of lumbar cord from a case of initial spinal paralysis of somewhat longer duration. Note complete disappearance even of vestiges of destroyed neurons. Reduced from a photomicrograph with a magnification of 36 diameters.

function in poliomyelitis are the lesions almost regularly present in the vestibular nuclei of the medulla, the roof nuclei and vermis of the cerebellum, and the motor cortex. While animal inoculation methods have revealed the presence of the virus in the motor cortex in human cases and not in the frontal or occipital regions,[6] histo-

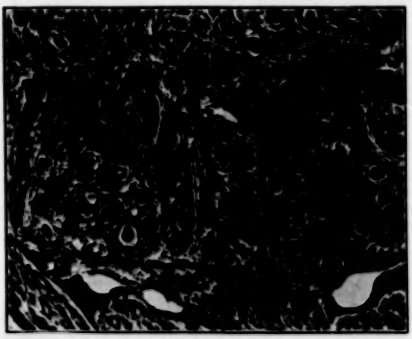

Fig. 6.—Spinal dorsal root ganglion in human poliomyelitis. Note destruction and neuronophagia of a number of neurons and interstitial cellular infiltration.

pathologic methods have permitted a much more precise localization of the affected zones. Brodmann's map of the human cerebral cortex (fig. 7), showing the areas possessing distinctive structure, is reproduced here to recall the location of areas 4 and 6, corresponding respectively to the motor projection and association centers of the cortex. Area 4 of Brodmann is described as "the center from which the impulses initiating voluntary movements on the opposite side of the body descend to the motor nuclei of the cerebrospinal nerves," and it is stated that the fibers arising from area 6 together with the fibers connecting this area with other subcortical regions are concerned in the correlation of postural and volitional motor control.[7] It is particularly worthy of note, therefore, that area 4 and especially the layer of Betz cells within it have been found to be most commonly affected. Thus, Horányi-Hechst[8] in 1935 found lesions in area 4 in 19 of his 24 human cases, while in 3 cases there also were lesions in area 6 and in only 2 cases were any found in area 1. In 1939 Swan[9] reported that, in the cortex of the 8 human cases he studied, "with one exception the only area

Fig. 9.—Upper lumbar cord of monkey with nonparalytic poliomyelitis killed ten to fourteen days after probable acute episode: *a*, note perivascular and interstitial cellular infiltration in anterior and lateral horns, where a loss of some neurons and degeneration of others are evident under higher magnification; reduced from a photomicrograph with a magnification of 19 diameters. *b* and *c*, anterior horn cells showing degenerative changes in the form of margination of Nissl substance and eccentricity of nucleus; reduced from a photomicrograph with a magnification of 640 diameters. These photomicrographs appeared originally in the Journal of Experimental Medicine.[10]

affected was the precentral gyrus, almost exclusively in the area gigantopyramidalis of Brodmann." And in 1941 Howe and Bodian[10] stated "In our own series of 13 cases [human] 12 showed lesions in area 4, consisting of perivascular cuffing, neuronophagia and focal mesodermal-glial infiltrations in all layers but especially in the layer of Betz cells, 2 showed a few

6. Sabin, A. B., and Ward, Robert: The Natural History of Human Poliomyelitis: I. Distribution of Virus in Nervous and Non-Nervous Tissues, J. Exper. Med. **73**:771 (June) 1941.

7. Ranson, S. W.: The Anatomy of the Nervous System, Philadelphia, W. B. Saunders Company, 1936.

8. Horányi-Hechst, B.: Zur Histopathologie der menschlichen poliomyelitis acuta anterior, Deutsche Ztschr. f. Nervenh. **137**:1, 1935.

9. Swan, Charles: The Anatomical Distribution and Character of the Lesions of Poliomyelitis with Special Reference to the Type of Cell Affected and to Portal of Entry of the Virus, Austral. J. Exper. Biol. & M. Sc. **17**:345 (Dec.) 1939.

10. Howe, H. A., and Bodian, David: Neuropathological Evidence on the Portal of Entry Problem in Human Poliomyelitis, Bull. Johns Hopkins Hosp. **69**:183 (Aug.) 1941.

lesions in area 6, 4 showed a few lesions in area 1, and 2 contained very infrequent and light lesions in the frontal granular cortex, in 1 case as far rostral as the orbital gyri." Figure 8, reproduced from Howe and Bodian's report,[10] shows the region around the central sulcus with lesions in the precentral (motor) cortex and none in the postcentral cortex. The presence of large numbers of polymorphonuclear leukocytes in the lesions in area 4 is indicative of their acute character, and there is also other evidence that involvement of this area is

Fig. 10.—Destruction of most of the right anterior horn of monkey with nonparalytic poliomyelitis. Reduced from a photomicrograph with a magnification of 16 diameters, which appeared originally in the Journal of Experimental Medicine.[10]

secondary to multiplication of virus in the lower motor neurons of the spinal cord or medulla. There is no evidence, however, that the affected Betz cells correspond exactly to destroyed lower motor neurons. In reviewing the pathologic physiology of poliomyelitis it may be worth considering the possibility that as regards certain muscle groups the upper motor neurons concerned in initiating voluntary movement may be significantly and predominantly affected.

Next I should like to examine the pathologic basis of the mild and transitory character of some types of paralysis encountered in poliomyelitis. The desired information obviously can be derived neither from a study of fatal human cases nor from studies on the experimental disease in monkeys resulting from infection with highly virulent strains of virus which produce a prostrating paralysis. However, a relatively high incidence of nonparalytic, mild paralytic and transitory paralytic poliomyelitis is encountered in monkeys inoculated with many strains of virus of human or recent human origin. In such animals it was found, first of all, that under certain conditions the host may achieve an equilibrium with the virus before a sufficient number of nerve cells is destroyed to produce paralysis and that monkeys do not need all their anterior horn nerve cells for apparently normal function.[11] Figure 9 *a* shows the upper lumbar cord of a monkey with nonparalytic poliomyelitis killed about ten to fourteen days after a probably acute episode. Extensive lesions can be seen in the anterior and lateral horns with considerable focal and diffuse cellular infiltration in the areas of outfall of cells. Under higher magnification (fig. 9 *b* and *c*) the majority of the remaining anterior horn cells show signs of degeneration in the form of marginated Nissl substance and eccentric nuclei, although only minimal signs of degeneration are found in the nerve roots at this stage. In monkeys killed at later stages one can find complete destruction or outfall of cells in most of an anterior horn at certain levels together with a pronounced reaction of degeneration in the corresponding nerve roots (fig. 10). No muscle tests to detect localized weakness were carried out on these monkeys, but their activity could not be differentiated from that of normal animals. These findings may be interpreted as indicating (1) that even when actual destruction of lower motor neurons occurs the segmental distribution of the lesions may be so spotty as not to affect the major innervation of a given muscle and (2) that the virus need not necessarily destroy all the affected neurons but can also produce only partial degenerative changes from which the cell may recover. A similar situation probably obtains in the instances of spontaneous recovery from distinct paralysis. Monkeys have been studied whose paralysis disappeared in as short a time as twelve to forty-eight hours after onset.[12] When such monkeys were killed several days after apparent recovery, one could still find the virus in their spinal cord and side by side with older glial foci of neuronophagia there were still present cells with chromatolysis and acidophilic intranuclear inclusions. Figure 11 *a* shows the anterior horn of the lumbar cord of a monkey which spontaneously recovered from paralysis of both lower extremities. Under higher magnification one can see that only a few essentially normal appearing neurons (fig. 11 *b*) are present, that most of the others exhibit chromatolysis and acidophilic, intranuclear inclusions (fig. 11 *c* and *d*), and that some of the cells had been completely destroyed as indicated by the glial foci of neuronophagia (fig. 11 *e*). These findings are not in accord with the older but still current belief that the transitory character of some paralysis is due to the disappearance of the edema and inflammatory exudate which temporarily interfered with the function of the nerve cells. As a matter of fact pronounced edema is rarely encountered in the absence of extensive neuronal destruction, while extensive cellular infiltration may be present in the absence of paralysis and usually persists long after the disappearance of paralysis.

Fig. 11.—Anterior horn of monkey killed two days after spontaneous recovery from paralysis of lower extremities. Reduced from a photomicrograph with a magnification of 68 diameters, which appeared originally in the Journal of Experimental Medicine.[10]

The discussion thus far has dealt entirely with the activity of the virus in the central nervous system. Next we may examine what is known about its behavior in the rest of the body and the factors which determine the special localization and distribution of lesions in the central nervous system. The oft reported and undeniable presence of hyperplasia and other changes in the lymphoid tissue throughout the body and occasionally also in the spleen and liver are still only poorly under-

11. Sabin, A. B., and Ward, Robert: Nature of Nonparalytic and Transitory Paralytic Poliomyelitis in Rhesus Monkeys Inoculated with Human Virus, J. Exper. Med. **73**: 757 (June) 1941. Bodian and Howe.[12]

12. Bodian, David, and Howe, H. A.: Pathology of Early Arrested and Nonparalytic Poliomyelitis, Bull. Johns Hopkins Hosp. **69**: 135, 1941.

stood. There is no evidence, however, of any pathologic changes in the muscles or peripheral nerves during the acute stage of the disease, and any change appearing later is of the type that follows destruction of the motor neurons.

A study of the distribution of virus in various parts of the body of persons dying of poliomyelitis has thrown considerable light on the tissues which are predominantly attacked in human poliomyelitis.[6] The results of tests on 22 different tissues from each of 7 cases, shown in table 2, indicated that the virus is found predominantly in two systems: (*a*) in certain regions of the nervous system and (*b*) in the alimentary tract. Its absence from the olfactory bulbs and associated rhinencephalic centers and from the nasal mucosa indicated that, contrary to common belief, the olfactory pathway is not the usual port of entry of the virus. The almost regular presence of the virus in the walls of the pharynx or ileum or in the intestinal contents and its respond with that expected from indiscriminate spread across the blood vessels or dissemination by way of the cerebrospinal fluid, with the ultimate localization dependent on the special susceptibility of certain cell groups.

There is no denying that some neurons are more susceptible than others to the effects of poliomyelitis virus, but many lines of evidence indicate that the part of the central nervous system first to be attacked by the virus is determined by the neural connections of the peripheral tissue from which the virus invades, and that the subsequent spread within the nervous system is dependent on the central connections of the neurons in which the greatest proliferation of the virus occurs. One is particularly impressed with this when one observes the relative distribution of neuronal lesions in various levels of the spinal cord and medulla in human cases of initial bulbar or spinal paralysis (fig. 12). In the typical primary bulbar case of short duration one finds a particularly

TABLE 2.—*Distribution of Virus in Human Poliomyelitis*

Tissues Tested	Case Number, Type and Duration of Illness						
	1 Spinobulbar S 2.5 d.* Par. 0.5 d.	2 Bulbar S 3 d. Par. 1 d.	3 Bulbar S 3 d. Par. 1 d.	4 Bulbar S 3 d. Par. 2 d.	5 Bulbar S 4 d. Par. 2 d.	6 Bulbar S 6 d. Par. 3 d.	7 Spinobulbar S 6 d. Par. 4 d.
1. Olfactory bulbs	0	0	0	—	0	0	0
2. Anterior perforated substance and adjacent corpus striatum	0	0	0	0	0	0	0
3. Anterior frontal + occipital cortex	0	0	0	0	0	0	0
4. Motor cortex	P	P	0	NP	0	0	P
5. Diencephalon	P	P	P	0	0	P‡ (+)	0
6. Mesencephalon	0	P	P	NP	0	P	0
7. Medulla (+ pons)	P	NP	P	NP	0	0	0
8. Spinal cord	P (+)	P (+)	P (+)	NP	0, P, P‡	0, NP, P‡	0, 0, 0‡
9. Superior cervical sympathetic ganglions	0	0	—	0	0	0‡	0
10. Abdominal sympathetic ganglions	0	0	0	0	NP (+)	0‡	0
11. Adrenals	0	0	0	0	0	0‡	0‡
12. Salivary glands	0	0	0 (10 d.)†	0	0	0‡	0‡
13. Cervical lymph nodes	0	0	0	0	0	0‡	0‡
14. Mesenteric lymph nodes	0	0	0	0	0	0‡	—
15. Axillary + inguinal lymph nodes	NP	0	0	0	0	0‡	0‡
16. Lungs + liver + spleen + kidneys	NP (+)	0	0	0	0	0‡	0‡
17. Nasal mucosa	0	0	0	0 (15 d.)	0	0‡	0
18. Pharyngeal mucosa ± tonsils	NP	P (+)‡	0	0	NP	P‡	0
19. Ileum—washed wall	P	0	0, P (+)	0, 0	0	P‡ (+)	0
20. Ileum—contents	P (+)	P	0	0	0	0	0
21. Descending colon—washed wall	0	0	0	0	0	P‡	0
22. Descending colon—contents	Empty	P	P (+)	P (+)	P	P	P

Reproduced from Sabin and Ward.[6]
P, paralytic poliomyelitis in inoculated monkey; NP, nonparalytic poliomyelitis in inoculated monkey; 0, no evidence of poliomyelitis; ‡, indicates that a cynomolgus monkey was used for the test; (+), passage positive.
* S 2.5 d., total duration of illness was 2.5 day.; Par. 1 d., paralysis 1 day.
† (10 d.), monkey died on 10th day.
‡ No tonsils in this case.

absence from most of the other tissues that were tested suggested that the alimentary tract may be the first site attacked by the poliomyelitis virus. Tests carried out last year by Dr. Ward and myself on various levels of the human alimentary tract revealed the presence of the virus in washed portions of the tongue, posterior pharyngeal wall, duodenum and various levels of the small and large intestines. In the experimental poliomyelitis which we produced in cynomolgus monkeys by feeding a strain of virus of recent human origin, we found the virus not only in the walls of almost the entire alimentary tract but also in the liver, spleen, kidneys, urinary bladder and certain lymph nodes as well as in the blood at the time of paralysis.[13] Despite this widespread dissemination of the virus in these animals, the virus was in no instance present in the cerebrospinal fluid and its distribution in the nervous system was similar to that found in human beings. The distribution of lesions and virus in the nervous system of human beings and experimental animals does not correspond with that expected from indiscriminate spread across the blood vessels or dissemination by way of the cerebrospinal fluid, with the ultimate localization dependent on the special susceptibility of certain cell groups.

There is no denying that some neurons are more susceptible than others to the effects of poliomyelitis virus, but many lines of evidence indicate that the part of the central nervous system first to be attacked by the virus is determined by the neural connections of the peripheral tissue from which the virus invades, and that the subsequent spread within the nervous system is dependent on the central connections of the neurons in which the greatest proliferation of the virus occurs. One is particularly impressed with this when one observes the relative distribution of neuronal lesions in various levels of the spinal cord and medulla in human cases of initial bulbar or spinal paralysis (fig. 12). In the typical primary bulbar case of short duration one finds a particularly heavy concentration of neuronal lesions in the medulla, especially in the regions of the nucleus ambiguus, dorsal motor nuclei of the vagus and the nucleus solitarius, with a smaller number of lesions as one descends in the spinal cord, so that in some instances no lesions whatever may be present in the highly susceptible lumbar cord.

In the primary spinal type of case the reverse obtains —the lesions are concentrated in the entire spinal cord and, although present, are less pronounced in the medulla. Much work still needs to be done on the neural pathways utilized by the virus for invasion of the central nervous system. Since in human beings the virus is predominantly situated in the alimentary tract, it may be worth while to consider the neural connections between it and the central nervous system (fig. 13). There is every possibility and a good deal of suggestive evidence that the virus may invade along the fifth, seventh, ninth and tenth cranial nerves from the upper part of the alimentary tract to give rise to a primary bulbar poliomyelitis. The absence of virus from the superior cervical sympathetic ganglions in

13. Sabin, A. B., and Ward, Robert: Insects and Epidemiology of Poliomyelitis, Science **95**: 300 (March 20) 1942; Behavior of Poliomyelitis Virus in Cynomolgus Monkeys Infected by the Oral Route.[14]

6 human cases [6] and in the orally infected cynomolgi [14] suggests that this sympathetic pathway leading to the upper thoracic cord is probably not utilized. As regards the cases in which the primary paralysis affects the lower extremities, intercostals and also upper extremities, it is not improbable that the visceral afferent fibers from the intestine by way of the dorsal

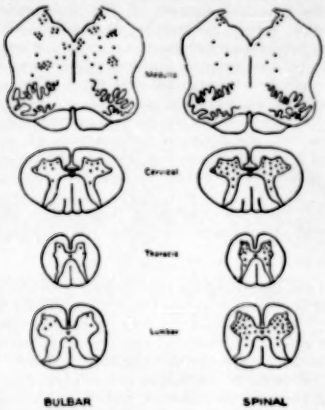

Fig. 12.—Relative distribution of neuronal lesions in bulbar and in spinal poliomyelitis.

root ganglions provide the usual pathway for invasion of the central nervous system. Tests on the celiac plexus in 8 human cases yielded virus only in 1, and even in that 1 the primary paralysis was bulbar; no virus was obtained from the celiac plexus of any of 5 orally infected cynomolgi. These findings tend to

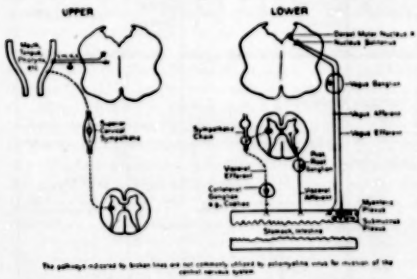

Fig. 13.—Neural pathways between alimentary tract and central nervous system. Possible routes of invasion by poliomyelitis virus. The pathways indicated by broken lines are not commonly utilized by poliomyelitis virus for invasion of the central nervous system.

militate against the visceral efferent pathway via the collateral sympathetic ganglions such as the celiac, as a common route for the progression of virus from the intestine to the spinal cord. Finally there is every possibility that the vagal afferent and efferent pathways between the intestine and the medulla may be utilized by the virus.

14. Sabin, A. B., and Ward, Robert: Behavior of Poliomyelitis Virus in Cynomolgus Monkeys Infected by the Oral Route, Abstr. J. Bact. **43**: 86, 1942.

CONCLUSION

I should like to stress the need for a thorough reinvestigation of the pathologic physiology of poliomyelitis based especially on the following considerations:

1. The almost constant involvement of the alimentary tract and the neural connections between it and the central nervous system along which the initial invasion of the virus probably occurs.

2. The irreversible complete destruction as well as the partial reversible damage to the neuron as the pathologic unit of poliomyelitis.

3. The presence of varying numbers of neurons that are so affected in sensory ganglions, various segments of the spinal cord, the various cranial nerve nuclei, reticular formation and vestibular nuclei of the medulla, the roof nuclei and vermis of the cerebellum and the midbrain, thalamus, hypothalamus, globus pallidus and motor cortex.

ATROPHY IN SKELETAL MUSCLE

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TORONTO, ONT.

Mammalian skeletal muscle is served by a number of different types of nerve fibers. Some represent the central and others the autonomic nervous system. Diagrammatic representation of the component parts of skeletal muscle innervation has been attempted in figure 1. Probably only the motor nerve fibers, axons of the lower motor neuron, make functional connection with the muscle fibers. It is generally believed that these fibers, and these alone, are responsible for the control of the activity of the muscle fiber and are chiefly responsible for the trophic state of muscle tissue.

Boeke [1] and others have claimed that muscle fibers are also innervated by autonomic nerve fibers. Such connections may exist, but there is no satisfactory evidence that the autonomic nervous system has any direct control over the activity of skeletal muscle fibers. Sympathetic and parasympathetic nerve fibers to blood vessels in muscle give the autonomic nervous system indirect control over muscular activity. Some influence over the trophic state of the muscle is obviously also attained by this control, or partial control, over the blood supply to the tissue. The work of Orbeli [2] and later of Tiegs [3] indicates that neurohumoral substances released in muscle as a result of autonomic stimulation can influence muscular contraction.

When skeletal muscle is deprived of its lower motor neuron, a process usually spoken of as denervation, a number of characteristic changes in the muscle take place. Such denervation is seen in many clinical conditions, most important of which are poliomyelitis and trauma to peripheral nerves. Unfortunately both are common in normal times, but the incidence of the latter has been greatly increased in every theater of war, whether it is a battlefield, a ship at sea or a bombed city. Thus an understanding of the pathologic physi-

Read in the Panel Discussion on Poliomyelitis at the joint meeting of the Section on Nervous and Mental Diseases and the Section on Orthopedic Surgery at the Ninety-Third Annual Session of the American Medical Association, Atlantic City, N. J., June 12, 1942.

1. Boeke, J.: Ztschr. f. mikr. anat. Forsch. **8**: 561, 1927.
2. Orbeli, L. A.: Klin. Wchnschr. **6**: 703, 1927.
3. Tiegs, O. W.: Proc. Roy. Soc. B **116**: 351, 1934.

ology of denervated muscle, as far as it will help us adequately to treat these tissues, is of special importance at the present time.

DEGENERATION OF DENERVATION

The most obvious features of the degeneration of denervation are four in number: (1) atrophy, (2) fibrillation, (3) changes in chemical excitability (hyper-

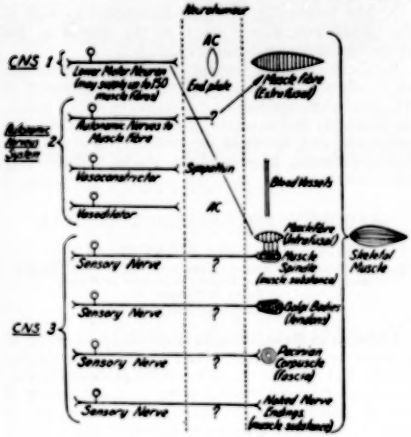

Fig. 1.—Innervation of skeletal muscle.

excitability to acetylcholine and potassium) and (4) changes in electrical excitability ("reaction of degeneration").

The atrophy or loss in weight of paralyzed muscle has been recognized since antiquity. The recent work of Fischer [4] has indicated that the muscle fibrils, which are probably the contractile part of the muscle fiber,[5] are the structures most severely damaged by the weight loss. Hines and Knowlton [6] have made a number of outstanding contributions to our knowledge of the changes in the chemical makeup of atrophying denervated muscle. Their findings indicate, among other things, that there is an absolute loss of contractile tissue and a relative and absolute increase in connective tissue during the atrophic process.[7] The continuous fine, random twitching seen in denervated muscle has been called fibrillation. This activity can be seen through the skin in many cases and is very obvious when the muscle is exposed. It is accompanied by action potentials, and these may be recorded as a means of evaluating the degree of fibrillation.[8] Hayes and Woolsey [9] have shown that the fibrillary contraction starts at the end plate in a muscle fiber and, once initiated, the contraction wave travels in a normal manner. Hypersensitivity to intra-arterially injected acetylcholine or potassium is always seen in denervated muscles and constitutes a change in the chemical excitability of the muscle. Changes in the electrical excitability are usually grouped under the term "reaction of degeneration." The altered response to galvanic current and the diminished response to faradic current are very definite and are represented diagrammatically in figure 2. The polarity phenomena also associated with the reaction of degeneration are bizarre, highly variable and not usually demonstrable on the exposed denervated muscle.[10]

All the principal features of the degeneration of denervation, that is, the atrophy, fibrillation, acetylcholine and potassium hypersensitivity and the reaction of degeneration, are probably interrelated. Denny-Brown and Pennybacker [11] suggested that the fibrillation was the result of an increased sensitivity of denervated muscle to acetylcholine. Recent experiments [12] support the view that fibrillation is the response of muscle, rendered hypersensitive to acetylcholine and potassium, to the quantities of either or both these substances normally found in the body fluids. It has also been suggested [13] that the reaction of degeneration may be linked with this chemical hypersensitivity of denervated muscle.

ATROPHY

Of all the features of the degeneration of denervation, the most important from the practical standpoint is the atrophy. The genesis of the atrophy remains obscure. Langley and Kato [14] believed that it was an overwork phenomenon caused by the fibrillary activity. The tension produced by fibrillation is much less than that resulting from the normal tonic activity of the muscle. Thus, unless the fibrillary contraction is of some unusual nature, a view not supported by Hayes and Woolsey, or unless we postulate a serious interference with the circulation to the muscle, the theory of overwork atrophy appears unreasonable.

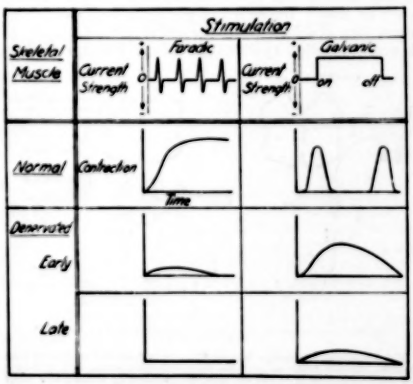

Fig. 2.—Reaction of degeneration.

Quinidine reduces or abolishes the fibrillation in denervated muscles. Using albino rats, Solandt and Magladery [8] decreased, in some cases abolished, detect-

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5. Astbury, W. T.: Ann. Rev. Biochem. **8**: 113, 1939.
6. Hines, H. M., and Knowlton, G. C., cited by Tower.[7]
7. Tower, Sarah S.: Physiol. Rev. **19**: 1, 1939.
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10. Roberts, F.: Brain **39**: 297, 1916.
11. Denny-Brown, D. E., and Pennybacker, J. B.: Brain **61**: 311, 1938.
12. Magladery, J. W., and Solandt, D. Y.: J. Neurophysiol., to be published.
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14. Langley, J. N., and Kato, T.: J. Physiol. **49**: 432, 1915.

able fibrillary activity without greatly affecting the atrophy. Levine, Goodfriend and Soskin [15] have reported that very large repeated doses of atropine will reduce both fibrillation and atrophy. In more recent experiments, as yet unpublished, we found that atropine produced reduction in atrophy but had less effect on fibrillation than had quinidine. The results of our former investigation on the action of quinidine and more recent comparison of the effect of atropine and quinidine do not support the view that the fibrillary activity produces the atrophy seen in denervated muscles.

Figure 3 illustrates the atrophy exhibited by the gastrocnemius muscles of rats when treated in three different ways.[16] All points on the curve represent averages involving a number of animals. The atrophy of denervation (lower motor neuron lesion) continued until the contractile elements were nearly or completely lost. It was accompanied, at least in the initial stages, by fibrillation and a great increase in sensitivity to intra-arterially injected acetylcholine or potassium. The muscle atrophy produced by cord section (upper motor neuron lesion) progressed for a period [17] and then regressed as illustrated.[18] Fibrillation was never detected, although there was a moderate increase in sensitivity to intra-arterially injected acetylcholine or potassium as long as the atrophic process was active. A similar result was obtained when the nerve supply to the muscle was left intact but the muscle immobilized by fixing the knee and ankle joints with steel pins. As shown in the chart the atrophy was somewhat greater than that obtained by cord section and showed no sustained regression.

Although the three methods of producing atrophy were fundamentally different, the course of the atrophy for the first ten days was almost identical. Fibrillation was seen only in the case of the lower motor neuron lesion but inactivity, relative or absolute, of the muscle in question was induced by all three experimental procedures. In view of this fact and the experimental comparison of the effects of atropine and quinidine already cited, it seems reasonable to attribute at least the initial atrophy to disuse rather than overwork.

After the first ten days the course of atrophy differed in the three experiments as shown in figure 3. That due to a lower motor neuron lesion progressed toward complete destruction of contractile elements while the atrophy following an upper motor neuron lesion regressed. In some cases this regression resulted in the affected muscles returning to their normal weight. The reason for the initial similarity and subsequent difference between the two types of atrophy is not understood but suggests a dual atrophic process, both parts of which are active only in the case of denervation.

These studies were initiated and are being continued in the hope that knowledge thus gained would suggest more effective methods of treating atrophying muscle. All such therapy must be aimed at keeping the muscle in as good condition as possible pending reinnervation. The results of research already accomplished offer some direction toward this desirable goal.

The fact that the disuse produced by skeletal fixation results in a wasting which develops as rapidly as the atrophy of denervation argues that splinting should

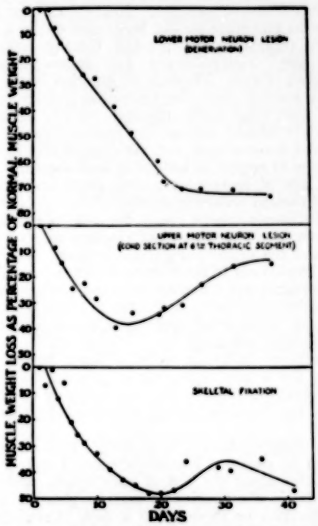

Fig. 3.—Atrophy in skeletal muscle.

be used with caution. Possibly this observation indicates the rationale for one feature of the Kenny method of therapy.

An understanding of the reason for the regression of initial atrophy in the case of upper motor neuron wasting might provide a valuable lead in devising methods of treatment. Unfortunately our experiments demonstrate the fact of regression but give no indication of the mechanism involved.

Periodic electrical stimulation of denervated muscle can decrease the atrophy. Although this may be considered as evidence in favor of the theory that the atrophy is a disuse phenomenon, it is possible that the benefit resulting from the electrically induced activity is brought about chiefly by the resulting increase in the circulation to the muscle. The normal circulation through muscle depends to some extent, not as yet evaluated, on the propulsive effect of the normal rhythmic contraction of muscle tissues. Such activity is lacking in denervated muscle, and the deficiency may reduce the flow of blood through the quiescent tissues.

This is simply one of many lines of investigation which are being followed at present in the hope that the information obtained will lead to new and better therapeutic procedures.

15. Levine, Rachmiel; Goodfriend, Joseph, and Soskin, Samuel: Am. J. Physiol. **135**: 747 (Feb.) 1942.

16. Research aided by a grant from the National Foundation for Infantile Paralysis, Inc.

17. Tower, Sarah S.; Howe, Howard, and Bodian, David: J. Neurophysiol. **4**: 398 (July) 1941. Eccles, J. C.: M. J. Australia **2**: 160, 1941. Solandt, D. Y., and Magladery, J. W.: Am. J. Physiol. **133**: 456 (June) 1941.

18. Solandt, D. Y., and Magladery, J. W.: J. Neurophysiol., to be published. Fischer, Ernst: Proc. Soc. Exper. Biol. & Med. **47**: 277, 1941. Solandt and Magladery.[17]

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PAIN AND TENDERNESS DURING THE ACUTE STAGE OF POLIOMYELITIS

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The management of the acute stage of poliomyelitis should be a combined effort of the family physician and the orthopedic surgeon. Nursing care of poliomyelitis in this stage should be carried on by a nurse specially trained in the physical therapy aspects of the disease. Sister Kenny has demonstrated the importance of this. There is no question in my mind that, in waiting until the quarantine period is over before instituting early physical therapy measures, recovery is delayed because the pain and spasm when unrelieved become more and more prominent in direct proportion to neglect in instituting such measures.

The lack of knowledge among physicians of what physical therapy means is not their fault. It is because medical students are not taught the value of this important asset in the treatment of diseases which involve joints and the neuromuscular mechanism. The information handed out to these students, when joint disease and deformities are discussed, is to use baking, massage and passive exercises. They are not told about the indications, methods of application or the dangers of wrong therapy measures.

There is no disease in which so much harm can be done by the wrong application of physical therapy as in poliomyelitis. This is also true of many other conditions; for example, acute subdeltoid bursitis and arthritis.

Many surgeons believe in prolonged rest and immobilization in plaster. For many years I have taught and written about the use of wire splints applied to extremities in the position of comfort plus the use of hot packs two or three times a day. Certainly the application of any apparatus in which the extremity is forcibly corrected or constantly fixed will increase atrophy, pain and muscle spasm, thus increasing the deformity. Prolonged fixation in one position causes stiffness in muscles (both paralyzed and nonparalyzed) and joints, and delays recovery.

Sister Kenny has demonstrated that early treatment beginning as soon as the diagnosis is made results in a more rapid disappearance of pain and spasm, and, when her ideas are applied, splinting is not necessary. When using the Kenny treatment it must be an all out plan. No one should assume that this is limited only to the nonuse of measures to prevent deformities. If one does, then disasters are sure to occur.

The name poliomyelitis means inflammation of the anterior horns, the result of which is a flaccid paralysis. To my mind this word has not been helpful in treating the disease, first, because so many wait for the paralysis to appear, and, second, because the damage is done before treatment is instituted. If one will take the trouble to examine a cross section of a spinal cord in an affected area forty-eight hours after the onset of the disease, one will find that there are signs of inflammation throughout all the structures of the cord.

It is impossible to see, by any stretch of the imagination, that pain, spasm in muscles, unexplained bone growth changes and vascular disturbances in the extremities are all due to a lesion in the anterior horns. In certain cases of poliomyelitis there are also sensory changes affecting the bladder, bowel and sometimes the skin, which also cannot be explained by anterior horn changes. This lesion too does not explain the occurrence of severe and continued pain so often seen in a nonparalyzed extremity or muscle group.

The symptoms of the early stage of infantile paralysis resemble those of any acute infection, but, in addition, it will be found that there is a stiffness of the posterior spinal muscles from the base of the skull to the sacrum. There may be also photophobia and a general hyperesthesia involving the neck, back, abdomen, chest and extremities. This hyperesthesia usually comes on very early and before the paralysis appears. It is not limited to areas which later become paralyzed.

There are cases in which a diagnosis of osteomyelitis and appendicitis has been made. Quite recently I have seen two children who had normal appendixes removed and who had infantile paralysis.

The superficial hyperesthesia is followed by a deep sensitiveness in any group or even in all the skeletal muscles. This pain also may not be limited to the paralyzed muscles; it may be even more severe and distressing in a nonparalyzed muscle. Patients when lying quietly in bed may appear to be perfectly comfortable until some one alters their position. On the other hand, the pain may be so severe that the slightest movement or jarring of the bed produces an attack of severe pain.

Sister Kenny points out that there is spasm in the affected muscles and also that this spasm may inhibit muscle function not only in the affected muscles but also in the antagonists. The spasm allows the affected muscle to contract and at the same time stretches the opposer, which, if allowed to continue long enough, will cause loss of power in the opposer. It has been long recognized among orthopedic surgeons that a constantly stretched muscle will lose power.

It seems difficult to understand how one can have spasm in flaccid paralysis. It must be remembered, however, that it is rare for any muscle or group of muscles to be completely paralyzed. It is possible that the unaffected cells may be in spasm from some factor which at present is not quite clear to us. There is no question in my mind that there is an intimate connection between the deep muscle tenderness and the spasm which occurs so often during the acute stage of poliomyelitis.

The areas chiefly affected by spasm and tenderness are the muscles of the cervical, dorsal and lumbar regions, the adductors of the shoulder, the abdomen, the calf; the knee flexors and extensors; the hip flexors, extensors, adductors and the abductors.

One of the most important aspects of the very early stage is to be able to recognize spasm and deep muscle pain. Each patient must be examined with great care and extreme gentleness or he will be treated as if he were convalescing from any acute infection. Rough handling, early massage, bad bed nursing and neglect will increase the acute condition. There are certain tests recommended by which it is possible to learn whether or not spasm, stiffness, and pain are present.

Muscle spasm may be felt and seen. Muscle soreness can be elicited by steady, gentle pressure of the muscles and by a gentle stretching of the muscles.

It is important to know how to test for tenderness. In the average case slow, gentle squeezing or pressing the muscles may elicit pain. Stretching the calf muscles

Read in the Panel Discussion on Poliomyelitis at the joint meeting of the Section on Nervous and Mental Diseases and the Section on Orthopedic Surgery at the Ninety-Third Annual Session of the American Medical Association, Atlantic City, N. J., June 12, 1942.

by gently, slowly and steadily dorsiflexing the foot when the leg is extended and slow, straight leg raising will result in pain in the hamstrings and buttock muscles. Attempts to straighten out flexion deformities at the knee and hip will be attended with pain.

Shoulder: Hold the shoulder down from above with one hand and gently abduct. If there is sensitiveness in the adductors, pain and spasm will occur in these muscles.

Neck and Spine: Place the patient on his side and flex his neck and trunk. If there is pain and spasm in the spinal muscles, the attempt at flexion will be resented.

Abdomen: To elicit tenderness, the physician should palpate the muscles with firm steady pressure until pain is exhibited by the patient.

Deformities in the early stages are due to pain, muscle spasm and muscle contractures. These are relieved by rest and the application of moist heat for prolonged periods as advocated by Sister Kenny, and the maintaining of the affected parts in the position of greatest comfort. The most important requirement during this period is a nurse who is thoroughly trained in the total management of these cases.

I have stated many times in print that this is the most neglected phase of the whole disease. Bad nursing and neglect will give bad results; results which may take years to overcome or which may never be overcome. It is better to use splints to prevent some of the havoc than to have more serious deformities occur. If the splints are to be used, they must be of wire so that they can be bent to conform to the comfortable position of the legs, because, as the spasm and deep tenderness lessen, the deformities lessen, and the splints can be straightened to coincide with the deformity. Stretching must be avoided, since it only increases the pain and spasm and results in more deformity.

Lovett [1] advocated warm baths in the acute phase. In fact, it was our custom to immerse these patients daily in a hot tub, the temperature being 95 to 105 F. It was noted then that their tenderness disappeared. Unfortunately, many of those patients were not seen by us for weeks after the onset. Miss Kenny starts treatment from the first day if possible. The earlier the symptomatic treatment starts, the shorter will be the period of tenderness, and the spasm ceases earlier. Gentle passive movements within the range of discomfort may be tried a few times throughout the day. The patient is encouraged to become muscle conscious during these movements.

Sister Kenny's treatment is superb nursing and common sense. Her patients show early disappearance of deep tenderness and muscle spasm, the texture of the skin is normal, flexibility of the joints comes on rapidly, and it is possible to start muscle re-education earlier. Because of these three things, early deformities are not seen in those cases under her care in the Minneapolis hospitals.

Muscle stiffness is a very common occurrence in the calf quadriceps, hip flexors and extensors, in the erector spinae muscles, and the adductors of the shoulders.

The inability of a patient to flex his trunk with his legs extended is seen very frequently after prolonged rest and prolonged muscle tenderness. This is not seen when hot packs are used continuously.

There are some who say that dry heat is as efficacious as moist, but in my experience that is not true. Cases of cerebral spastic paralysis will not relax when treated with dry heat, but will do so in hot baths. The problem then in the early stage is expert nursing, early hydrotherapy, gentle passive movements within the range of discomfort in order to prevent muscle and joint stiffness, and active exercises of groups of muscles as soon as the spasm and soreness have disappeared. The longer one puts off such measures, the slower will be recovery of muscle function.

It is not to be supposed that complete recovery will be the rule, but better and earlier recovery is better than little or no recovery. One must remember from the point of view of function that any degree of recovery may make all the difference between dependence and independence in any disease which causes crippling.

234 Marlborough Street.

1. Lovett, Robert W.: Treatment of Infantile Paralysis, Philadelphia, P. Blakiston's Son & Co., 1916, p. 37.

EFFECTS OF IMMOBILIZATION AND ACTIVITY ON NEUROMUSCULAR REGENERATION

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This report is concerned with the results of experiments dealing with the effects of various conditions on the extent and rate of neuromuscular atrophy and regeneration. These include such conditions as immobilization of the limb by casts, forced exercise, electrical stimulation of the paralyzed muscle, application of cold and heat and attempts to enhance functional reinnervation through facilitation of axon bifurcation.

Most of the experiments were carried out on the gastrocnemius muscles and tibial nerves of adult albino rats and included quantitative measurements of muscle mass, strength and creatine content. Complete paralysis of the gastrocnemius was produced by crushing the tibial at the level of its junction with the peroneal. Partial paralysis was produced by removing a section of one or more of the spinal nerves contributing motor fibers to this muscle.

Quantitative studies were made as to the condition of the muscles and nerves at designated times after either complete or partial denervation. For most of the experiments the muscle and nerve of the contralateral limb not operated on served as controls. Measurements of strength were made by determining the amount of isometric tension developed by the muscle in response to stimuli applied directly to the muscle and to its motor nerve. The stimuli were of such duration, frequency and intensity as to cause maximal responses.

The course of atrophy and regeneration was found to run a remarkably constant course in this species. For a period of about two weeks following nerve crushing the muscles lost weight, strength and creatine at a rate precisely that following denervation by nerve section. The first signs of functional reinnervation, as revealed by faint contraction responses to motor nerve stimulation, appeared on the twelfth to the fifteenth day. At this time fibrillary activity, which first appeared three days after denervation, could no longer be detected. However, increased sensitivity to acetyl-

Aided by a grant from the National Foundation for Infantile Paralysis, Inc.

Read in the Panel Discussion on Poliomyelitis at the joint meeting of the section on Nervous and Mental Diseases and the Section on Orthopedic Surgery at the Ninety-Third Annual Session of the American Medical Association, Atlantic City, N. J., June 12, 1942.

choline injections persisted as long as thirty-five days after establishment of the lesion. After the onset of reinnervation the affected muscles rapidly increased in strength, weight and creatine concentration. At eighty-four days they had recovered to within 85 to 90 per cent of that in their controls. The rate of regeneration of muscle weight following reinnervation follows a

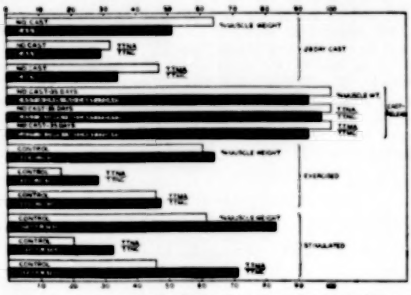

Chart 1.—Average values for degree of atrophy and strength of gastrocnemii. The strength was determined from the responses to direct and nerve stimulation.

mathematical formula essentially like that for the body growth rate. The changes in muscle creatine and strength were due in part to changes in the quantity of contractile tissue present and in part to alterations in the functional state of the structural elements present.

Immobilization of the limb in a neutral position by the application of plaster casts definitely retarded recovery from the paralysis resulting from peripheral nerve injury. Immobilization had no appreciable effect on the rate or extent of atrophy prior to reinnervation. One finds the same degree of atrophy and loss of strength in the muscles of a denervated immobilized limb as in its contralateral noncasted denervated control prior to the onset of reinnervation. No evidence could be found that immobilization either hastened or retarded the extent and velocity of axon regeneration. The most striking effects of immobilization were a retardation of the recovery of muscle mass and strength following reinnervation.

On the other hand, forced activity induced by either swimming daily for one hour or exercise in a revolving barrel for two hours a day was in no instance found to be detrimental to neuromuscular regeneration. In fact, the overall effects point toward the conclusion that exercise facilitates recovery from the paralysis due to peripheral nerve injury. Because of the difficulties of securing cooperation of the animal in eliciting early muscular movements following reinnervation, attempts were made to enhance the degree of muscular contraction by the use of electrical stimuli. Induction shocks of such intensity and frequency as to cause strong sustained contractions of the muscle and without doubt some degree of "overstretching" and "local fatigue" proved not to be detrimental to any phase of neuromuscular regeneration. Such stimulation for a brief period of three minutes a day greatly retarded muscle atrophy prior to reinnervation and accelerated the recovery of muscle weight and strength subsequent to reinnervation. There appeared to be a direct relationship between the intensity of the stimulus and its effectiveness in retarding atrophy which may have been due only to the number of muscle fibers activated by the stimulus.

My colleague Dr. Knowlton has investigated the effects of external temperature on neuromuscular regeneration. In one group of animals the paralyzed limb was immersed in water kept at 112 to 117 F. for five hours daily. In another group the limb was immersed in ice water for the same period of time. After twenty-one days there was no difference in the strength and weight of the muscle from the animals in these two groups. They showed essentially the same extent of regeneration as in control animals. These findings should not be interpreted as evidence against the use of hot applications in the early treatment of poliomyelitis, in which the application of heat is for purposes other than the enhancement of neuromuscular regeneration.

It has long been known that axon branching occurs during the regeneration of peripheral nerves. The extent to which such axon branching may be utilized in the reinnervation of partially paralyzed muscles is a matter of controversy. Much of the uncertainty is due to lack of suitable controls and adequate methods of measuring the degrees of functional recovery.

The previously mentioned technics have been employed in a study of partially paralyzed muscle with the view of evaluating the functional aspects of axon bifurcation. Partial paralysis of the gastrocnemius was produced by removing a section of the sixth lumbar nerve. The degree of paralysis resulting from such nerve section was determined by measuring the muscle tension which developed on stimulation of the tibial nerve, after allowing four days for loss of excitability in the severed axons. These measurements were compared with the strength developed on direct muscle stimulation and with values obtained on the contralateral control limb. In a number of animals the sixth lumbar section was combined with a crushing of the tibial nerve in order to facilitate axon bifurcation and to allow for a reinnervation of motor units which had been paralyzed as the result of spinal root section.

Studies made on the muscles and nerves of animals subjected to the combined effects of lumbar section and tibial nerve crushing show that such muscles were always inferior in weight and strength to their controls afflicted only with spinal nerve section. The measure-

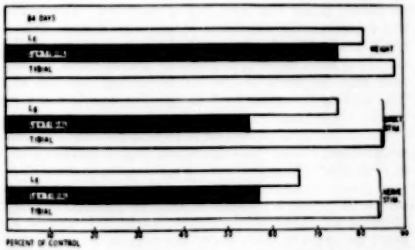

Chart 2.—Average values for the atrophy and strength of gastrocnemii from animals subjected to either crushing of tibial nerve, removal of segment of sixth lumbar or the combined lesions.

ments were made at various times and as late as eighty-four days after denervation, which is sufficient time to allow for 80 to 90 per cent recovery in muscles with crushed nerves. That axon bifurcation takes place in crushed nerves of the rat has been shown by Greenman. These experiments, however, offer no evidence for its usefulness in promoting functional recovery in partially paralyzed muscles.

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SUMMARY

A study has been made of the effects of various conditions on the extent and rate of recovery from complete and partial paralysis resulting from peripheral nerve injury. The criteria of recovery included measurements of muscle composition, mass and strength. Immobilization by the application of casts retard recovery from paralysis. This appears to be due to a lessened rate of muscle regeneration rather than an effect of nerve regeneration. Activity induced by forced exercise in revolving cages and swimming and electrical stimulation to the point of overstretching and even local fatigue does not appear to be detrimental to any phase of neuromuscular regeneration. The overall effects of natural and artificial activity are in the direction of an improvement in the rate and extent of recovery from peripheral nerve paralysis.

No evidence was found that axon branching could be utilized to enhance the reinnervation of partially paralyzed muscle.

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THE ROLE OF PHYSICAL THERAPY IN THE EARLY TREATMENT OF POLIOMYELITIS

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A review of the medical literature during the past quarter century reveals many glowing reports on results from treatment of acute anterior poliomyelitis by numerous and widely different forms of physical therapy. In the earlier days bakes, massage and muscle training in conjunction with some form of immobilization during the acute stage only [1] were thought to offer great hope for the repair of these damaged muscles. Townsend [2] in 1916 stated that his best results in a New York epidemic were obtained in children kept in bed for at least one year. Judson [3] advised rest and fixation for twelve to twenty-four months. During this same period both faradic and galvanic stimulation of involved muscles was strongly advocated by some. Peckham [3] stated in 1916, "Treatment should begin at once even in the acute stage by application of heat in order to obtain a fresh influx of blood to the paralyzed muscle." He recommended use of a 500 watt electric bulb for twenty minutes, then mechanical stimulation by vibration. Later the Hubbard tank was introduced, and still later the large warm water pools replaced the tanks for under water therapy. In more recent years the Kendalls [4] have revived the idea of prolonged fixation and protection, and their work was widely heralded as a tremendous advance in the treatment of this disease. The principles of their method were distributed in bulletin form by the U. S. Public Health Service. Now in the past two years Sister Kenny's method has risen to a position of prominence in this country and at present seems to be gaining momentum as the newest and most popular fad. All of which makes one wonder if we are not merely traveling in a circle.

In most of these instances the disease has been considered as a purely local muscle lesion, the basic lesion in the anterior columns of the spinal cord being completely ignored. It is easy to understand how physical therapists, enthusiastic in their work, might lose sight of this primary pathologic process. It is impossible, however, to understand how orthopedic surgeons can wholeheartedly endorse any of these methods as a dependable means of controlling the after-effects of this disease. Our knowledge of the pathology of poliomyelitis, long recognized and often proved, should not permit us to accept and sanction unquestionably any treatment which in reality amounts to nothing more than tinkering with the peripheral secondary change in the muscles themselves.

During the years 1935 to 1941 inclusive my associates and I have seen 245 recent cases of poliomyelitis (487 involved extremities) at the St. Louis Unit of the Shriners' Hospitals for Crippled Children, in which an attempt has been made to compare results with various forms of treatment. These patients have reached a stationary level in their recovery and we are able to state definitely the degree of residual involvement which they show. For the comparative study of these results we have attempted to estimate the return of function in an extremity as a whole and compare this with the original involvement. For the initial involvement, only two classifications were used: (1) those extremities showing complete paralysis, which includes those with no muscles rated better than poor, and (2) those showing only partial paralysis with muscle gradings higher than this. For the estimated residual function in these extremities, five classifications have been used:

1. Zero.—Completely flail extremity or one with a few muscles showing no more than a trace in power.

2. Poor.—Slight return, but with muscles rated no better than poor and consequently of little or no functional value.

3. Fair.—Fair return in most muscles and perhaps good in a few, but with insufficient return in the more important muscles to permit a brace free extremity.

TABLE 1.—*Summary of Fifty-Three Extremities (Thirty-One Patients) Treated by Short Periods of Immobilization of One to Four Months Without Physical Therapy*

Involved Part and Degree of Original Involvement	Number	Final Rating				
		Zero	Poor	Fair	Good	Normal
Arms						
Complete paralysis	..	..	..	..	..	..
Partial paralysis	8	..	..	..	5	3
Legs						
Complete paralysis	26	10	9	4	2	1
Partial paralysis	10	..	1	4	13	1

TABLE 2.—*Summary of Fourteen Extremities (Nine Patients) Treated by Short Periods of Immobilization of One to Three Months in Solid Plaster Followed by Physical Therapy for Three to Six Months*

Involved Part and Degree of Original Involvement	Number	Final Rating				
		Zero	Poor	Fair	Good	Normal
Arms						
Complete paralysis	..	..	..	..	..	..
Partial paralysis	1	..	..	1	..	..
Legs						
Complete paralysis	7	1	2	3	1	..
Partial paralysis	6	..	..	2	4	..

From the Shriners' Hospital for Crippled Children and the Department of Surgery, Washington University School of Medicine.

Read in Panel Discussion on Poliomyelitis at the joint meeting of the Section on Nervous and Mental Diseases and the Section on Orthopedic Surgery at the Ninety-Third Annual Session of the American Medical Association, Atlantic City, N. J., June 12, 1942.

1. Lovett, R. W.: A Plan of Treatment in Infantile Paralysis, J. A. M. A. **67**: 421 (Aug. 5) 1916.

2. Quoted by Stern, W. G., in discussion on Lovett.[1]

3. Peckham, F. E., in discussion on Lovett.[1]

4. Kendall, H. O., and Kendall, F. P.: Pub. Health Bull. 242, U. S. Government Printing Office, 1938.

4. Good.—A satisfactory brace free extremity. This means at least good return in the major muscles, but with some residual involvement. Extremities with good muscles about the hip and knee, but with residual involvement of muscles about the foot, are listed in this group.

5. Normal.—Those extremities with no demonstrable residual involvement. The same criteria have been used in estimating the return of power in the muscles of the upper extremity, except for the necessity of using apparatus. Upper extremities are frequently seen with the deltoid paralyzed, while the remainder of the extremity shows little or no involvement. Such extremities have been classified as good. It is obvious that such a classification is based on a rough estimate of the residual involvement. It is justified, however, since the amount of function which an extremity shows determines the value of the therapy used.

For this comparative study the cases have been grouped according to the type of treatment used, and results have been listed separately for the original complete paralysis and the original partial paralysis. Table 1 shows the results in cases treated by short periods of immobilization with no physical therapy. Weight bearing was permitted as soon as the period of immobilization ceased, supportive apparatus being used if indicated.

Table 2 shows cases treated by short periods of complete fixation followed by physical therapy for from three to six months. Protection of the extremity during the period of physical therapy was maintained by plaster splints or specially prepared braces to prevent active use. Physical therapy consisted of limited active and passive motion either in the pool or on a table, in which case each treatment was preceded by baking and massage of the involved extremity. These treatments averaged about twenty minutes daily for five days each week. Temperature of the water in the pool was about 95 F.

TABLE 3.—*Summary of Eighty-Eight Extremities (Forty-Six Patients) Treated with Prolonged Plaster Immobilization of Four to Eighteen Months without Physical Therapy*

Involved Part and Degree of Original Involvement	Number	Final Rating				
		Zero	Poor	Fair	Good	Normal
Arms						
Complete paralysis	8	..	1	4	3	..
Partial paralysis	7	..	..	1	4	2
Legs						
Complete paralysis	57	27	14	14	2	..
Partial paralysis	16	..	1	7	8	..

TABLE 4.—*Summary of Seventy Extremities (Twenty-Five Patients) Treated with Prolonged Plaster Immobilization of Three to Twelve Months and Longer, Followed by Physical Therapy for Eight to Twenty-Four Months*

Involved Part and Degree of Original Involvement	Number	Final Rating				
		Zero	Poor	Fair	Good	Normal
Arms						
Complete paralysis	14	..	1	7	6	..
Partial paralysis	11	..	..	1	5	5
Legs						
Complete paralysis	33	16	8	8	1	..
Partial paralysis	12	..	..	1	7	4

Table 3 shows the results obtained in cases treated by prolonged immobilization for from four to eighteen months with no physical therapy. For the most part this immobilization consisted of absolute fixation in solid plaster, and the remainder of the period in bivalved plasters or plaster splint.

Table 4 shows an analysis of cases treated by prolonged plaster immobilization followed, after three to twelve months, by continued immobilization and accompanying physical therapy. Fixation of some form with no free active use of the extremity was maintained in all cases for periods of from eight to twenty-four months.

TABLE 5.—*Summary of Two Hundred and Sixty-Two Extremities (One Hundred and Thirty-Four Patients) in Which No Treatment Was Used*

Involved Part and Degree of Original Involvement	Number	Final Rating				
		Zero	Poor	Fair	Good	Normal
Arms						
Complete paralysis	47	3	5	7	14	18
Partial paralysis	28	..	..	1	17	10
Legs						
Complete paralysis	106	20	24	17	36	9
Partial paralysis	81	..	2	15	55	9

TABLE 6.—*Results in Extremities for Each Group Regardless of Degree of Original Involvement*

Group and Treatment	Total No.	Zero	Poor	Fair	Good	Normal
Group 1. Immobilization 1 to 4 mos.; no physical therapy	53	19%	19%	13%	30%	9%
Group 2. Immobilization 1 to 3 mos.; physical therapy 3 to 6 mos.	14	7%	14%	43%	36%	0
Group 3. Immobilization 4 to 18 mos.; no physical therapy	88	31%	18%	30%	19%	2%
Group 4. Immobilization 3 to 12 mos.; physical therapy 8 to 24 mos.	70	23%	13%	24%	27%	13%
Group 5. No treatment	262	9%	12%	13%	47%	17%

Table 5 shows cases in which no treatment whatever was used. Some of these patients were seen by us early in the disease and merely kept in bed for various periods of time, without any attempted therapy, weight bearing being permitted as soon as the patient felt able. Others were patients who lived in inaccessible communities and who usually were without the immediate services of an orthopedic surgeon or physical therapist. These patients were kept in bed only during the acute illness, and most of them were made to attempt to walk as soon as they could venture out of bed. In many instances the parents felt that the paralysis would progress unless the child was forced to use the involved extremities and exercise them as much as possible. These patients were seen in the clinic from six weeks to twelve months after onset of illness. Since these patients did not have accurate muscle charts early in the process, it may be argued that considering them in this discussion is not justified. The parents, however, were questioned as to whether the involved extremity in each instance showed complete or partial paralysis. This was determined by whether or not the patient lost all ability to move the extremity in question. If the extremity could not be actively moved, it was felt safe to assume that there was extensive involvement and to classify it as completely paralyzed. When some ability to move the extremity remained, the involvement was listed as partial paralysis.

Table 6 shows the results in each group without classification according to the degree of involvement. From this it can be readily seen that no particular form of therapy produced results that were outstanding. In fact, the highest percentage of satisfactory brace free extremities occurred in that group of patients who received no treatment during the early stages and who began to walk without support as soon as they could get

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out of bed. The degree of initial paralysis was of far greater value in determining the degree of residual involvement than was the type of treatment used. Classifying all groups together, there were 298 extremities showing complete paralysis at the onset, and 189 extremities showing only partial paralysis. Final rating in each of these is shown in table 7.

From these findings it seems safe to assume that the results in anterior poliomyelitis can be more adequately explained on the basis of the underlying pathologic process than on the form of the early treatment used. Initial paralysis in many instances is due to a block in the pyramidal tracts from localized edema, congestion and cellular infiltration without actual destruction of the ganglion cells. Such a paralysis is temporary in character, and muscle function returns with relief of pressure from the anterior horn cells with the subsidence of the edema. Instances of only partial paralysis of an extremity in the beginning can easily be explained on this basis and could account for their higher percentage of satisfactory results. Those extremities showing satisfactory functional return, in spite of apparent initial complete paralysis, can also be explained on this basis. If, however, the anterior horn cells are actually destroyed, the muscles supplied by those nerve cells will remain completely paralyzed regardless of the type of treatment.

In this study there have been no cases treated by the Sister Kenny method. It has been my privilege to visit briefly the various hospitals in Minneapolis and see some of the cases treated under Sister Kenny's supervision. From the standpoint of symptomatic treatment in the acute stage this method may offer definite advantage, but it falls far short of supplying the answer to our problems in this disease. Sister Kenny prefers to consider the local muscle involvement as the primary pathologic process and feels that the damage to the spinal cord is of secondary importance. She will admit, however, that spinal cord damage does exist in those patients who show persistent residual involvement. Muscles that have previously been considered paralyzed

TABLE 7.—*Results for Groups Combined According to Degree of Original Involvement*

Degree of Original Involvement	Total No.	Zero	Poor	Fair	Good	Normal
Extremities with initial complete paralysis	298	26%	21%	22%	22%	9%
Extremities with initial partial paralysis	189	0	2%	13%	62%	13%

she prefers to consider as merely alienated because of the spasm existing in opposing groups as a result of their involvement; i. e., the muscles we have originally considered involved she considers satisfactory but merely alienated. She uses as proof the fact that these muscles later show evidence of return even though they may never attain more than a trace in power. She refuses to admit that this could be due to restitution of function in a few of the ganglion cells. Since such ideas cannot be reconciled to our present knowledge of the proved pathologic process in this disease, and since many of her patients also show residual paralysis and even flail extremities, I feel certain that this method in time will take its place among the others offered by the field of physical therapy as having been tried but found wanting.

Vast sums of money have been raised in this country in recent years for carrying on the fight against poliomyelitis. Much of this money has been and is still being devoted to continuation of physical therapy and to follow-up studies on the results of this treatment in various clinics. This seems strange in view of the fact that physical therapy has repeatedly made fabulous claims for one method or another but has yet to offer a treatment that has been able to stand the test of time or which can be justified from the standpoint of the pathologic process involved. Physical therapy will never prove to be the answer to our problems in this disease. The control of poliomyelitis will undoubtedly some day be brought about through its prevention and not through its cure, and the sooner more of our available funds are used for research work in the field of immunology, the sooner our investment will begin to yield satisfactory returns.

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SOME PUZZLING ASPECTS OF PAIN IN THE CHEST

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Our present knowledge of the causes of pain in the chest is rather meager. This is in contrast to the situation as regards abdominal pain, and the explanation for the difference is probably to be found in the frequency with which patients presenting obscure abdominal pain are subjected to surgical exploration. Thus the cause of the pain is determined and the disease process is correlated with the patient's symptoms. When there is an obscure pain in the chest the diagnosis can frequently be arrived at only by autopsy, which is carried out in a relatively small percentage of cases. Nevertheless the results of thorough clinical study are not altogether fruitless in such cases, and it is with some findings arrived at by this method that I wish to deal here.

When approaching a patient with chronic pain in the chest one should remember that there is only one common serious cause, i. e. disturbance of the coronary circulation. Most of the other common causes are of trifling significance. Thus the physician is faced in most instances with the necessity for making a decision as to whether the patient has an inconsequential condition or a mortal disease. Hence, when there is pain in the chest the first question to be answered is: Is this pain due to deficiency of the oxygen supply to the heart, i. e., if acute, is it due to coronary thrombosis, or, if chronic and recurrent, is it due to angina pectoris?

The answer to this cardinal question was difficult to arrive at a generation ago, but this is no longer the case. The classic studies of James B. Herrick [1] on coronary thrombosis and the publication of Keefer and Resnik [2] on angina pectoris clarified the confusion surrounding these subjects, and it is now possible to recognize both of these conditions with a rather high degree of accuracy. Indeed, one gains the impression that both conditions are now diagnosed more frequently than they exist, a state of affairs which is just the opposite to that prevailing a generation ago.

From the Department of Internal Medicine, Bowman Gray School of Medicine of Wake Forest College.
Read before the Section on Miscellaneous Topics, Sessions on General Practice, at the Ninety-Third Annual Session of the American Medical Association, Atlantic City, N. J., June 10, 1942.

1. Herrick, J. B.: Clinical Features of Sudden Obstruction of the Coronary Arteries, J. A. M. A. **59**:2015 (Dec. 7) 1912.
2. Keefer, C. S., and Resnik, W. H.: Angina Pectoris: A Syndrome Caused by Anoxemia of the Myocardium, Arch. Int. Med. **41**:769 (June) 1928.

Once the decision has been made that the pain of a given patient is not of coronary origin, i. e. once we know what is not causing the patient's pain, the next problem is to discover what is causing it. My purpose in the present communication is to discuss a series of conditions which bear either a close or a superficial resemblance to the pain of coronary disease and to mention some of the points which have seemed to be of value in differential diagnosis. No attempt will be made to give a comprehensive survey of all the conditions which may cause chest pain, as such a survey would necessitate a much more detailed discussion.

SOME CONDITIONS COMMONLY CONFUSED WITH CORONARY THROMBOSIS AND ANGINA PECTORIS

Since the pain of myocardial anoxia may be felt in almost any region between the nose and the navel, it may be simulated by a great many disorders. Ordinarily the resemblance is only superficial, but there is a group of disorders which is likely to cause confusion. I shall not attempt to deal with all these but only with some which have occasionally proved exceptionally difficult.

1. *Myalgia and Arthralgia in the Region of the Left Shoulder.*—These conditions do not ordinarily cause difficulty, because the pain is related to movements of local parts rather than to general exertion, such as walking. Occasionally, however, a person with such disorders will complain of pain on walking, and one finds that this pain is due to the swing of the arm, being absent when the patient walks with his left hand in his pocket. More confusing are the rather frequent instances of patients who develop "muscular" pain in these shructures in association with coronary disease. Such pain, which is perhaps dependent on reflex muscle spasm resulting from the disease of the heart, may be associated with local tenderness over the pectoral or deltoid muscles and may be aggravated by abducting or lifting the arm. Patients with angina pectoris not infrequently have such a pain, which occasionally may be more troublesome than the substernal pain of effort. In all middle aged and elderly subjects complaining of a pain in the left arm, one must make a careful study for the possible presence of angina pectoris, even though the pain presents all the characteristics of muscular pain. Discomfort of this type is frequently observed in patients with coronary disease. An instance follows:

Case 1.—A man aged 62 came to have his heart examined because of pain in the region of the left shoulder. He stated that this pain was not related to walking but was brought on by bending over and picking up objects with the left hand or by putting his left hand on the back of his head. He was fearful of heart disease because a relative had recently had an attack of coronary thrombosis associated with pain in the region of the left shoulder.

On examination there was tenderness to pressure in the muscles of the upper aspect of the left arm. The blood pressure was 166 systolic and 102 diastolic. The heart was negative to physical examination and within normal limits by fluoroscopic examination. An electrocardiogram revealed no abnormality except left axis deviation. The patient at first stated that he did not have any discomfort on walking except for slight dyspnea on rather severe exertion, but more careful questioning revealed that on one occasion about two months before, while walking up a steep hill against a cold wind, he had had some substernal heaviness. The story was rather vague and he was not very clear about this particular episode. Exercise was therefore carried out under observation. Walking up two flights of stairs at a fairly brisk rate caused a little panting but no feeling of pressure or other distress. However, walking up four flights of stairs induced a feeling of constriction, with a mild cramplike pain beneath the sternum and in the suprasternal notch. Repetition of the same exercise after the administration of $\frac{1}{200}$ grain (0.0003 Gm.) of glyceryl trinitrate caused no such distress, although the panting was again induced. A year later, while attending a social function and feeling in excellent spirits, the patient suddenly died.

In this case the existence of what seemed to be a typical myalgia furnished the clue which led to the detection of angina pectoris. Although one might think that the two conditions were coincidental, they occur so frequently together as to give rise to a belief that the shoulder pain may be due to muscle spasm induced reflexly by the disease of the heart.

2. *Spinal Arthritis.*—As a rule this condition does not cause confusion with the pain of coronary disease. However, occasionally the two occur simultaneously. The following case illustrates this association:

Case 2.—A woman aged 73 had mild congestive heart failure, auricular fibrillation and pain in the upper lumbar and lower dorsal regions which was definitely related to movements of the body. Walking induced dyspnea but no pain. The back was rigid, with considerable muscle spasm, and the x-ray examination showed advanced hypertrophic arthritis in the lumbar region. The cardiac condition responded satisfactorily to treatment. A year later the patient was seen again and at this time she stated that her low back pain was still present and that she now also had pain high in the back of the chest and in the back of the neck. This pain was not related to movements of the head or of the spine, although such movements still caused pain in the lower back. On the other hand, walking, which did not affect the pain in the lumbar region, induced the pain in the upper dorsal region and the back of the neck. This discomfort was relieved by glyceryl trinitrate, which did not affect the low back pain. The electrocardiogram now showed depression of the S-T interval in the fourth lead, this change not having been present the previous year.

In an elderly patient with known chronic spondylitis, the development of a new site of back pain naturally led to the suspicion that this too was dependent on spinal arthritis. The presence of auricular fibrillation, which is very rarely found in association with angina pectoris,[3] might seem to constitute evidence against the cardiac origin of the pain. However, the relation of the pain to walking, its relief by glyceryl trinitrate and the associated electrocardiographic changes seemed to leave no doubt that the patient had angina pectoris. It is not unusual for a patient with this disease to have substernal distress associated with discomfort in the back of the neck. However, an occasional patient, such as the one cited, may have the pain of angina pectoris only in the latter region.

3. *Pericarditis.*—Acute inflammation of the pericardium, when associated with the accumulation of purulent exudate or when due to tuberculosis or rheumatic fever, is not likely to be confused with coronary disease. There is, however, a type of pericarditis which commonly leads to an erroneous diagnosis of coronary thrombosis. This occurs most frequently in the winter months and especially in individuals who have had a recent respiratory infection. The onset is usually sudden, but the pain is more likely to be stabbing and to be intensified by breathing and is usually less constrictive in character than the pain of coronary thrombosis. Except for this the two conditions simulate each other very closely, both being associated with fever,

3. Levine, S. A.: Clinical Heart Disease, ed. 2, Philadelphia, W. B. Saunders Company, 1940.

leukocytosis and somewhat similar electrocardiographic changes. Cases of this type have been described in detail recently by Barnes.[4]

CASE 3.—A man aged 37 developed a pain in the region of the lower sternum. This pain was aggravated by breathing. Within four hours after the onset of the pain his temperature was 102 F. and the leukocyte count 13,000. On the following day there were minimal signs at the base of the right lung, these consisting of questionable dulness and some diminution in breath sounds. An electrocardiogram was negative. Following the administration of sulfathiazole his elevation of temperature suddenly diminished. Ten days later the pain recurred, slightly to the right of the sternum. This pain also was worse with respiration and stabbing in character. The following day a pericardial friction rub was heard and an electrocardiogram revealed inversion of the waves in leads 1, 2 and 4. He improved rapidly but continued to have slight fever for several months.

In this case the illness resembled coronary thrombosis in certain respects. However, the appearance of fever and leukocytosis within such a short time after the onset, the relation of the pain to breathing and the delay in the development of the electrocardiographic signs indicate that the patient had pleurisy followed by pericarditis.

4. *Mediastinal Lymphadenitis.*—Although postmortem examinations teach us that infections in the lymph nodes of the mediastinum are of common occurrence, little is known about the clinical picture they produce. In view of the frequency of mild pain in the neck in patients with cervical adenitis, it seems probable that obscure minor discomfort in the chest, developing in association with infections of the respiratory tract, may result from swelling of the mediastinal lymph nodes. The following patient had discomfort which is believed to have been related to infection of these structures:

CASE 4.—A white man aged 29 came for examination because of supposed heart disease. He complained of substernal pain which had first been noted seven months before, had disappeared after three weeks and had recently recurred. This pain was sharp and cutting in character and appeared especially when he was out in the cold air or when he exerted himself. He had also noted it on coughing. Several weeks previously he had had pain in the right axilla on deep inspiration as well as on coughing. Examination of the heart revealed no abnormalities. An electrocardiogram was negative except for a diphasic T wave in lead 4-F. A roentgenogram of the chest revealed typical lesions of tuberculosis, with cavitation at the right apex. There was also some increase in hilus markings.

It seems probable that in this case the substernal pain was related to infection in the mediastinal nodes (or mediastinal pleura) secondary to pulmonary tuberculosis. Similar discomfort may be observed in patients with nontuberculous infections of the respiratory tract. The following case is an example:

CASE 5.—A white man aged 63 complained of "tightness and heaviness" in the upper substernal region. This was brought on by coughing and disappeared within a few minutes after coughing was stopped. He had had a chronic cough since he had pertussis at the age of 3 and he also suffered from recurrent sinusitis. The heart was negative to physical examination, but examination of the lungs revealed scattered squeaking rales and some moist rales at the bases. A roentgenogram of the chest displayed a decided increase in bronchial markings. An electrocardiogram was normal. Walking up four flights of stairs caused dyspnea but no pain.

Although this patient's pain was substernal, the only definite findings were those of bronchitis and bronchiectasis. Presumably, infection in the mediastinal lymph nodes had occurred and was responsible for the discomfort.

5. *Penetrating Diseases of the Aorta.*—Any condition which causes rupture of the aortic walls leads to excruciating pain resembling that seen in certain cases of myocardial infarction. During the past several years numerous cases of dissecting aneurysm with pain of this type have been reported. More rarely such pain may be caused by rupture of the aorta due to necrosis of the medial coat, without the formation of a dissecting aneurysm. Although syphilitic aortitis, when not complicated by aneurysm, aortic insufficiency or narrowing of the orifices of the coronary arteries, is ordinarily a painless disease, saccular aneurysm may induce intense pain due either to pressure on sensitive structures or to erosion of the aortic wall by the syphilitic process. Porter [5] has recently reported a number of cases of rupture of a syphilitic aneurysm into the pulmonary artery and has described the syndrome so produced. The following case, which represents an example of this syndrome, displayed certain features which were strongly suggestive of coronary artery disease:

CASE 6.—A white man aged 69 complained of attacks of pain in the chest of one year's duration. The pain was sharp and knifelike and lasted only a few seconds. The pain was not related to exercise, emotion, eating or any precipitating factors which could be determined. Examination revealed hypertension, much cardiac enlargement, congestive failure, arborization block and striking elevation of the S-T segment, with absence of the R wave in lead 4. There was minimal fever but no leukocytosis; the sedimentation rate was normal. After a week's hospitalization the signs of congestive failure were diminished and the abnormalities in lead 4 were much less striking. Fluoroscopic examination at this time showed cardiac enlargement and pronounced dilatation of the aorta. Wassermann and Kahn tests were negative. He continued to have attacks of pain in the chest, left arm, upper abdomen and back. The pain was not related to exertion or other precipitating factors, and relief by glyceryl trinitrate was questionable. He had several attacks of severe intensity which lasted twelve or more hours and were thought by his physician to be due to coronary thrombosis. During one of these seizures he was admitted to the hospital in a state of circulatory collapse, the blood pressure being 105 systolic and 50 diastolic, as compared to 180 systolic and 140 diastolic on the previous hospital admission. On this second admission a basal systolic murmur, which had been faint when he was previously seen, was rather loud and was well heard in both the pulmonary and the aortic areas. The murmur was higher pitched than it had been previously. He died in collapse within a few minutes after this admission to the hospital and at autopsy was found to have syphilitic aortitis and an aortic aneurysm which had ruptured into the pulmonary artery. The heart was moderately enlarged but no myocardial scars were seen; there was no evidence of infarction, and the coronary arteries revealed no narrowing and only minimal atheromatous changes.

In this case the changing character of the electrocardiogram and the presence of severe pain led to an erroneous diagnosis of coronary thrombosis. With proper interpretation of the history this mistake should have been avoided because of the fact that none of the numerous attacks of pain had been related to effort. Although no diastolic murmur was heard on the final admission, the patient was in collapse and even in this

4. Barnes, A. R., and Burchell, H. B.: Acute Pericarditis Simulating Acute Coronary Occlusion, Am. Heart J. **23**: 247 (Feb.) 1942.

5. Porter, W. B.: The Syndrome of Rupture of an Aortic Aneurysm into the Pulmonary Artery, Am. Heart J. **23**: 468 (April) 1942.

state he had a high pulse pressure. This finding should perhaps have led to the suspicion that a communication existed between the aorta and the pulmonary artery.

The conditions which have been considered thus far have been of thoracic origin. Attention may now be focused on a group of abdominal disorders which may simulate coronary disease.

6. *Duodenal Ulcer.*—Although in most cases peptic ulcer is associated with a characteristic train of symptoms, there are exceptional cases in which the pain may be felt in the chest and confused with that of angina pectoris. An instance follows:

Case 7.—A white man aged 63 complained of a heavy feeling and mild pain in the lower substernal region and in the precordium. This came on shortly after meals and was benefited by soda and by atropine. On several occasions this feeling of heaviness radiated to the left arm. Discomfort was never related to effort and always came on soon after eating. There was no story of relief by food. Physical examination was negative, as was the electrocardiogram. Examination with the roentgen ray revealed a normal heart but showed well defined pylorospasm and a filling defect in the duodenum which was interpreted as a healed duodenal ulcer. Atropine produced complete relief of symptoms when taken regularly in adequate doses.

The mechanism of pain in this case was apparently different from that in the usual ulcer case. Pylorospasm seemed to be the chief factor and, as occasionally happens, the pain produced by it was felt in the chest rather than in the abdomen. This led the patient, who was a physician, to suspect coronary disease. The tendency to emphasize the significance of location and radiation of chest pain rather than the importance of the circumstances under which it occurs is a common cause of errors in diagnosis.

7. *Pylorospasm Secondary to Disease of the Gallbladder.*—Ordinarily, discomfort associated with cholelithiasis and chronic cholecystitis tends to be localized on the right side of the body. There are, however, exceptional instances in which these disorders may be associated with pain radiating to the left shoulder and arm. The following case is an example:

Case 8.—A white man aged 56 complained of "heart trouble." For several months he had had occasional attacks of mild pain in the left side of the chest under the clavicle, with occasional radiation into the left side of the neck and down the left arm as far as the hand. The discomfort consisted of a feeling of tightness and fulness. It was not related to exertion, to breathing or to mental stress and was often completely relieved by belching.

Twenty years previously he had had an attack of severe cramplike epigastric pain which required morphine hypodermically for relief and was associated with nausea. Since then he had had a number of such attacks and in the intervals had noted considerable belching and vague abdominal distress.

Examination of the cardiovascular system was negative except for the blood pressure, which was 154 systolic and 94 diastolic. Slight tenderness was noted under the right costal margin and somewhat more tenderness in the midepigastrium just above the umbilicus.

The electrocardiograms showed no significant abnormality in either the precordial or the limb lead. Cholecystograms revealed a nonfunctioning gallbladder. Roentgen study of the gastrointestinal tract was negative except for well defined pylorospasm and aerophagia.

When the patient walked rapidly up three flights of stairs under observation there was no pain. However, distention of the stomach with air introduced through a duodenal tube caused the appearance of pain in the epigastrium, left side of the neck and left arm. The patient said that this pain was identical with that which caused him to come for examination.

The symptoms observed in this case are frequently observed in cases of pylorospasm, whether of functional origin, or accompanying organic disease, such as peptic ulcer or cholelithiasis. Such symptoms frequently result in an erroneous diagnosis of angina pectoris. This error is unavoidable if too much stress is laid on the location, radiation and character of the pain rather than on the history of the behavior of the pain. The discomfort due to pylorospasm can often be reproduced by artificial distention of the stomach either with air or with water.

8. *"Cascade Stomach."*—In the course of a routine examination of the gastrointestinal tract, roentgenologists may observe that the barium first enters an upper pouch which is situated to the left and posteriorly and enters the main part of the stomach only after this upper pouch becomes filled. At this time the barium is seen to fall over from the upper pouch into the main part of the stomach, and the resemblance to a waterfall has led to the term "cascade stomach." The condition seems ordinarily to be accompanied by no symptoms or at most by minor digestive complaints. However, I have seen 3 cases in which cascade deformity of the stomach was associated with chest pain of a type which could readily be confused with the pain of coronary disease. The following case summary is illustrative:

Case 9.—A white man aged 37 complained of "heart trouble." All his life he had had some "skipping" of the heart and recently he had become increasingly heart conscious, having been made so by an attack of violent pain in the anterior lower left part of the chest. This pain came on when he was stooping over to tie his shoes; it lasted for about thirty seconds and was associated with such weakness that he fell to the ground and thought that death was imminent. The pain was described as being very severe and of cramping and tearing character. It did not radiate to the shoulder or arms. He led an active life and had never had pain in the chest on exertion. For several years he had had attacks of nausea and vomiting, coming on almost daily about an hour after breakfast.

Examination of the cardiovascular system revealed no abnormalities except a blood pressure of 150 systolic and 95 diastolic. There was slight tenderness in the epigastrium in a localized area. The electrocardiogram was normal in all respects. Fluoroscopic examination of the stomach was reported as follows: "As barium passed to the stomach it accumulated in the cardiac end, which dilated into a large sac in the posterior position. It was not until this dilated sac became about half full that any barium passed over into the body of the stomach. At the junction of the body and the dilated cardia there was a definite constriction with a lumen of perhaps an inch in diameter. This constricted area was examined closely for visualization of an ulcer but none could be found. Except by overflow no barium passed into the body of the stomach in the erect position. When the patient was placed with his face down on the table all the barium was found to be in the body of the stomach and passed on into the duodenum in a normal fashion." The following day the fluoroscopic examination of the stomach was repeated, with the following results: "With the patient in the erect position the barium was swallowed, and at this time the stomach was normal in appearance and showed only the slightest tendency toward cascade. There was none of the spasm which, on the previous day, had elevated the body of the stomach and constricted it at the junction of the cardia and the body. The patient was completely relaxed at this examination and there was no nausea on filling or imminent vomiting, as had been noted on the previous day after swallowing the barium."

The only explanation which could be found for the pain in this case was the abnormal degree of spasm between the cardia and the body of the stomach. Two other cases presenting a similar association of cascade

stomach and pain simulating coronary disease have been observed. Since, in all three instances, the pain responded satisfactorily to measures directed at the gastrointestinal rather than at the cardiovascular system, there would seem to be no doubt that cascade deformity of the stomach, in certain cases, leads to pain in the chest.

9. *Diverticulum of the Stomach.*—I have seen only 1 case in which a diverticulum of the stomach caused chest pain. This was observed in consultation with Dr. Wingate Johnson, to whom I am indebted for the following facts:

CASE 10.—A man aged 54 complained of recurrent attacks of severe "grabbing" pain beneath the middle and lower sternum, radiating to the left arm and rarely to the right arm. The pain, which had been present intermittently for twelve years, did not usually appear during effort but frequently came when he was fatigued after effort, and especially shortly after eating. It was severe, frequently requiring morphine for relief, and appeared in spasms which lasted a few minutes and continued to occur at intervals of ten or more minutes for a period of several hours. Physical examination revealed no evidence of cardiovascular disease. There was pronounced malnutrition because the patient, having learned that eating induced his pain, had taken little food. An electrocardiogram revealed no significant change other than a tendency toward right axis deviation.

Walking up two flights of stairs caused weakness and fatigue but no pain and only slight panting. Fluoroscopic examination revealed a small, centrally placed heart with normal pulsations. A large diverticulum about 4 cm. in diameter was found in the upper part of the stomach. This was subsequently removed at operation.

In this case the pain bore a close resemblance to that of angina pectoris in location, radiation and character. However, the conditions causing the pain were different, there being no relation to effort and a definite relation to meals. The symptoms resembled closely those of esophageal hiatus hernia, as recently described in detail by Jones.[6]

10. *Dextrose Deficiency.*—In cases of diabetes and coronary arteriosclerosis the administration of insulin may precipitate attacks of angina pectoris. Sippe and Bostock[7] have pointed out that spontaneous hypoglycemia may induce attacks in persons with coronary disease. However, it does not appear to be generally recognized that chest pain, not anginal in type and not associated with a grave prognosis, may also occur as the result of dextrose deficiency.[8] An example follows:

CASE 11.—A white man aged 49 complained of recurrent attacks of weakness associated with a "sinking feeling" and with precordial pain radiating to both shoulders. These seizures had never appeared shortly after meals; they usually occurred three to four hours after eating and on several occasions had awakened him in the middle of the night. The pain was rather mild but had led him to suspect that there was heart disease. This suspicion was confirmed in his own mind when a physician made an electrocardiogram and told him that it showed trouble with the circulation to the heart. There was one other important point in the story, which was the patient's insistence that his "spells" bore no relation to physical activity and that he was able to walk rapidly, even up hill or up stairs, without dyspnea or discomfort.

Physical examination of the heart revealed no abnormality. Electrocardiograms were negative in the limb leads, but all the precordial leads displayed slurring of the QRS complex and inverted T waves. When questioned about any previous disease of the lungs or injury to the chest the patient at first gave a negative history but later remembered that several years before he had had an airplane accident and had fractured several ribs by striking the left side of his chest against the control stick. Investigation of the gastrointestinal tract with the roentgen ray yielded negative results. A dextrose tolerance test was done with the following findings: fasting blood sugar 83 mg. per hundred cubic centimeters, thirty minutes after dextrose 160 mg., one hour 178 mg., three hours 69 mg. and four hours 81 mg. The administration of 15 units of insulin produced a seizure of weakness and precordial discomfort. The patient stated that this induced attack was similar to the spontaneous seizures. When a low carbohydrate, high protein diet with intermediate feedings was prescribed the symptoms improved, recurring only when he violated his diet. One year later he was still almost completely relieved.

On superficial analysis the combination of precordial pain radiating to the shoulders, a "sinking feeling" and well defined abnormalities in the precordial leads of the electrocardiogram might seem to indicate definite coronary disease. However, more careful analysis led to the conclusion that the symptoms were related to a state of mild dextrose deficiency, while the alterations in the electrocardiograms could be ascribed to a healed contusion of the heart. Beck[9] has described similar electrocardiographic changes occurring subsequent to nonpenetrating injury to the chest.

COMMENT

No attempt has been made to present a comprehensive discussion of the various conditions which may cause pain in the chest. My purpose has been rather to select a few conditions which seem to illustrate the importance of proper evaluation of the patient's story. Frequently, objective methods of examination are of the greatest value; occasionally, however, they may yield negative results and the physician may be tempted to make the assumption, often unjustified by subsequent events, that the patient's complaints are entirely of psychogenic origin. Furthermore, information that is obtained by objective methods may actually be misleading unless it is correlated with the history. (In case 11, for example, the electrocardiogram when considered alone and without relation to the story of previous injury to the patient had led to an erroneous diagnosis.)

Another serious dilemma occasionally results from too great reliance on objective tests. This occurs when the patient has two different conditions simultaneously, both of them causing pain in the chest. Under such circumstances the objective methods of examination may reveal evidence of only one of them, and this may be the least important of the two. In the middle aged, obese man the coexistence of gallbladder disease and angina pectoris is rather frequently observed. Both of these conditions may cause chest pain. If, as is occasionally the case, the electrocardiogram happens to be within normal limits while the cholecystogram is abnormal, the physician may make the diagnosis of the

6. Jones, C. M.: Hiatus Esophageal Hernia, New England J. Med. **225**: 963 (Dec. 18) 1941.

7. Sippe, C., and Bostock, J.: Hypoglycemia: Survey and Account of Twenty-Five Cases, M. J. Australia **2**: 302 (Sept. 2) 1933.

8. The term "dextrose deficiency" rather than "spontaneous hypoglycemia" is used because patients differ considerably in the level of blood sugar at which symptoms develop, and many patients suffering from symptoms of dextrose deprivation may have blood sugar levels only slightly below the normal range.

9. Beck, C. S.: Contusions of the Heart, J. A. M. A. **104**: 109 (Jan. 12) 1935.

abdominal disorder and overlook entirely the existence of the coronary disease, which offers the greater threat to the patient's life.

In deciding whether a given pain represents angina pectoris the physician should not put too much emphasis on the location or radiation of the discomfort. In most of the cases which have been cited the pain corresponded in these respects to that of angina pectoris. The severity of the pain likewise is of relatively little value in diagnosis because the discomfort may be rather severe when its cause is inconsequential and may be mild in fatal cases of angina pectoris. Even the character of the pain is not a reliable guide. Several of the patients without angina described their pain as consisting of a feeling of heaviness, tightness or fulness.

The duration of the pain is of considerable importance in the exclusion of angina pectoris. A pain lasting only a few seconds or a pain lasting more than an hour is rarely due to uncomplicated angina pectoris, although the pain of acute coronary thrombosis frequently lasts for many hours.

The most important feature of the history is the careful inquiry into the relation of the pain to the various body functions, and especially to muscular activity. If there is no relationship to exertion, it is highly improbable that the patient has angina pectoris, but even so the number of errors in diagnosis will be reduced if the physician will, when in doubt, note whether muscular exercise undertaken under observation induces the discomfort. Conceivably, exertion may be hazardous to a person with angina pectoris. However, if the history has been carefully taken and the exercise is adjusted so as to be minimal for this particular patient and is stopped the moment the discomfort appears, the risk is probably very small and, in any event, it is less than the risk involved to the patient in not having a correct diagnosis made.

It may be stated as a general rule that any pain in the upper abdomen, chest, neck, shoulders or arms which has a definite relationship to physical exertion should be considered as angina pectoris until proved otherwise. This rule is subject to certain rare exceptions, but these are not likely to lead to confusion. The pain of pleurisy and the pain associated with inflammation of the mediastinal lymph nodes may be exaggerated by exertion (case 4). In such instances the pain is usually sharp and has a definite relation to respiration. Such a relationship rarely, if ever, exists in the pain of coronary disease. Occasionally the pain of esophageal hiatus hernia may be worse on effort, as has been recently emphasized by Jones.* However, the relationship to effort is not as striking and the discomfort cannot be regularly reproduced by walking, while the story of relation to position and to eating will usually provide the proper clue.

The causes of pain in the chest are many, and the procedures which may be carried out in order to ascertain the exact cause are very numerous. Unless one is willing to subject every patient with a complaint of chest pain to a barrage of roentgenograms, chemical studies and other expensive procedures, one can avoid pitfalls only by a painstaking and elaborate history with especial emphasis on the relationship of the pain to various functions of the body. From such an analysis of the patient's story the correct clue can usually be obtained, and as a rule one or two additional studies will bring confirmation.

ABSTRACT OF DISCUSSION

Dr. Ferdinand F. Schwartz, Painesville, Ohio: In my experience, chest pains are often due to allergy, especially allergy to nicotine. Today when females smoke as do males, doctors should keep in mind the possibility of an allergic reaction especially to nicotine in tracing down chest pains.

Dr. Henry M. Thomas Jr., Fort George G. Meade, Maryland: Dr. Harrison has touched on only a few of the conditions other than coronary occlusion which produce pain in the chest. I have been impressed with the frequency of pain below the breast in women when there was no apparent reason for it, and I wonder whether Dr. Harrison has an adequate explanation. Many women complain of such pain, and on examination there is tenderness in the breast tissue. Two conditions have been seen at Fort Meade in young soldiers which are worthy of mention. One of them was an attack of interstitial mediastinal emphysema. This young soldier was engaged in a double time drill when he felt pain in his left chest which radiated to the shoulder and down the arm. He was studied for several days, and no signs developed. He said "I can hear a sound in my chest." The ward surgeon listened and there was no sound. The man said "There is no sound when I sit up or stand up, but only when I lie down." The surgeon had the patient lie down and there was a loud crunching noise which occurred with each beat of the heart. Later he developed a little free air in the pleural cavity also. It all cleared up, and the symptoms disappeared. The other condition was an attack of agonizing pain that a young man had after sitting for some time in a bent over position. When he started to sit up, this pain struck him in front of the heart. He slumped down and in a minute tried again with the same result. Finally he straightened up, something snapped, and the pain disappeared. I believe that he had crossed two costal cartilages, which pinched, and that as he stood up they became free and the pain disappeared.

Dr. Winsate M. Johnson, Winston-Salem, N. C.: A patient whom Dr. Harrison saw and whom I treated for some time, for eleven years had drawn total and permanent disability insurance for attacks of pain in his chest. But it was noticed that the attacks came on right after meals. X-ray examination showed a diverticulum at the cardiac end of the stomach, which pointed upward, so that, when he swallowed, food would be caught in it. He was operated on, the diverticulum was removed, and he is better but still has the habit spasm and also the total and permanent disability.

Dr. Clark W. Day, Indianapolis: I want to call attention to a condition that I find quite often. Intercostal neuralgia will cause much pain. X-ray examination will often reveal a metastasis of some kind into the spine. Dr. Johnson spoke about a diverticulum. About ten years ago I saw a man who would eat a meal and then would have a severe pain in his chest. We took a picture and found that a diverticulum had started just at the upper end of the esophagus and had run down to the arch of the aorta. It was impossible to operate. The patient was 63 years old. He died from starvation, because the diverticulum increased in size until he couldn't keep anything in his stomach. So-called intercostal neuralgia often is in fact a mediastinal reflex from some other condition.

Dr. Emilio Leopold Hergert, Brooklyn: I was invited seven years ago to a party at which everybody drank beer. I did not care for beer, so I asked the lady if she had any wine. I was the only one who drank any of that homemade wine. I was a school medical instructor in Brooklyn. The next morning I was taken with an attack of pain in the heart. I came home and sent for a doctor, who made a diagnosis of coronary thrombosis. He gave me a hypodermic of a half grain of morphine, which relieved the pain. I was told to stay in bed for twelve weeks. I felt perfectly well after that. I rose out of bed on the third day and returned to work. A week later I had an electrocardiogram taken, and the doctor made a diagnosis of coronary occlusion. That was over six years ago. I had no more pain. I did not stay in bed three months and I am still very much alive.

DR. F. M. POTTENGER, Monrovia, Calif.: There is one kind of pain not mentioned by the speaker which I would like to discuss: the recurrent pain over the lower portion of the chest of patients who previously have had pleurisy. Chronic inflammation of the pleura, as well as of other viscera, produces degenerative changes in the muscles, skin and subcutaneous tissue which are reflexly connected with the inflamed area. This type of pain varies. Sometimes it is severe; at other times it is only an ache. It is particularly necessary to recognize it when it involves the lower portion of the chest, because it often extends down over the abdomen, and the pain is sometimes mistaken for evidence of acute disease of the abdominal viscera. I have seen gastric ulcer, gallbladder disease and appendicitis not only suspected but operations performed to remedy these supposed conditions when no active disease was present, the cause being the permanent injury to the nerves caused by the previous pleurisy. The degeneration which follows a chronic pleurisy is often seen as a distinct furrow following the nerve or nerves involved. The subcutaneous tissue not only loses its tone but actually atrophies and lessens. These same nerves that are involved in the degeneration often show pain. This pain is recurrent, the same as recurrent pain in arthritis. It comes with changes in weather, with menstruation, and when the patient is subjected to emotional and nervous stress. This should always be kept in mind when attempting to determine the origin of recurrent pain over the lower chest and upper abdominal areas. If degeneration with lessening of the thickness of the subcutaneous fat is found, one should suspect previous pleurisy even if no signs are found on auscultation. Sometimes lagging of the side, weakness of the auscultatory note and stretching sounds or fine rales will be detected on deep breathing to help in the diagnosis. I have seen this years after the acute attack of pleurisy subsided.

DR. MEYER GOLOB, New York: There is an explanation why in the presence of a lesion in the right upper abdominal quadrant pain may be referred to the precordium. The late Dr. David Riesman of Philadelphia said that, if a patient complains of pain below the left diaphragm, think of the heart; if he complains of the heart, think of the stomach; if he complains of both, think of the thyroid. I want to make particular mention of right upper abdominal disease with referred symptoms elsewhere. There are many such cases. I have under my care patients with definite cholecystopathy, with symptoms distant to the site of the lesion. One case of calculous cholecystitis had a classic clinical picture of precordial pain suggestive of a lesion above the left diaphragm. There was, however, a normal electrocardiograph. There are cases, of course, in which concomitance must be thought of. One may have a gastropathy or a cholecystopathy, with or without stones, and have in addition vascular disturbance, coronary artery disease, for instance. From the standpoint of age incidence both gallbladder disease and cardiovascular disease are more common in the aged. The emphasis is on the referred pain. If the patient has pain in the precordium, with a silent right upper abdominal quadrant, one must think of eliminating a right upper abdominal lesion with referred pain to the precordium.

DR. TINSLEY R. HARRISON, Winston-Salem, N. C.: Certainly chronic pleurisy may cause pain in the precordium which may be confusing, because there are often no physical signs of the pleurisy, and the x-ray evidence may be dubious. Gallbladder disease likewise may cause pain that is felt only in the substernal region rather than in the classic area. It is important to emphasize the frequency of intercostal neuralgia as a cause of pain. In my experience, tobacco has been an uncommon rather than a common cause of pain in the chest. The point raised by Dr. Thomas about the frequency of this apical pain in women is an important one, and I don't think any one can aswer his question as to what causes it. Occasionally this pain seems to arise in the breast tissue itself. There are a certain number of these women who have precordial hyperesthesia and who have also a "tight feeling" in that region, in whom one can reproduce the pain by distending the colon or the stomach with air. Even so, we are still left with a large number of these people in whom we can't account for the pain and in whom we are all too ready to label it as psychogenic in origin when it would be wiser to say "pain, cause unknown." The situation as regards coronary thrombosis and angina pectoris has changed completely in the last generation. Twenty years ago these conditions were overlooked with great regularity. Now they are all too frequently diagnosed when they do not exist. This error will probably continue to be made until more cases are studied carefully in people who do not have angina pectoris or coronary thrombosis but who have pain simulating them and until we are able to correlate the clinical picture of such patients with autopsy findings. It is perhaps worth while to reemphasize that, although these various conditions which have been mentioned are conditions which cause confusion with angina pectoris and coronary thrombosis, if one relies on the location and radiation of pain, such confusion can usually be avoided if one centers one's attention on the conditions which produce the pain. I know of no other conditions in which the pain is likely to have the same relation to effort as is true in the case of angina pectoris. A careful history is still and probably always will be the most important method of diagnosis in patients with pain in the chest.

THE EFFECT OF MORPHINE AND PROSTIGMINE METHYLSULFATE

ON MEASUMENTS OF PAIN THRESHOLD

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Clinical reports have been presented which suggested that the combination of morphine and prostigmine methylsulfate has definite therapeutic advantages over morphine alone.[1] The investigations reported in the present paper were undertaken in the hope of obtaining more objective evidence regarding this reported potentiation.

METHODS

The Hardy-Wolff method of measuring pain thresholds was used throughout the study. The stimulus intensity at the threshold was measured either with a radiometer or with a wattmeter connected in the lamp circuit, it having been previously shown that there is a linear relationship between these variables over a wide range of intensities.[2] At each test several determinations were made until a satisfactory threshold was established. The desired dose was then administered subcutaneously and the pain threshold redetermined at intervals of fifteen minutes until it returned to its original value, or until it was evident that the drug given had not produced an effect. Addicts receiving repeated doses were given the drugs at 6 a. m., 11 a. m., 5 p. m. and 10 p. m. On test days the 6 a. m. dose was postponed until a threshold was established at about 8 a. m., so that these men were about ten hours abstinent at the start of the test. Except for the patient who received repeated doses, no subject knew what drug he received and in fact did not know that prostigmine methylsulfate was being studied.

RESULTS

It was first established that prostigmine methylsulfate alone has no threshold raising effect in doses up to 1 mg. These doses were studied for two hours after admin-

From the United States Public Health Service Hospital.

1. Slaughter, Donald; Parsons, J. C., and Munal, H. D.: New Clinical Aspects of the Analgesic Action of Morphine, J. A. M. A. **115**: 2058-2060 (Dec. 14) 1940. Slaughter, Donald, and Munsell, D. W.: Some New Aspects of Morphine Action Effects on Pain, J. Pharmacol. & Exper. Therap. **68**: 104-111 (Jan.) 1940.

2. Andrews, H. L., and Workman, Ward: Pain Threshold Measurements in the Dog, J. Pharmacol. & Exper. Therap. **73**: 99-103 (Sept.) 1941.

istration and in no case was there any significant change in the pain threshold.

Two normal persons with no history of morphine addiction were then each given 8 mg. of morphine and 0.5 mg. of prostigmine methylsulfate. A third normal person received 0.5 mg. prostigmine methylsulfate ninety minutes after 8 mg. of morphine had been given,

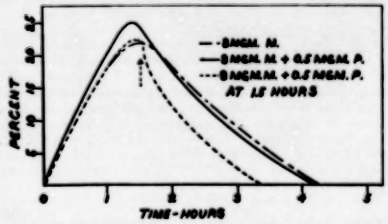

Chart 1.—The percentage of rise in pain threshold over the preinjection value is plotted against the time after administration. The slightly increased effect with the combined medication is of no practical significance.

at a time when the threshold raising effect of the morphine was nearly maximal. The results of these tests are shown in chart 1 and are compared with the curve obtained previously on normal persons with 8 mg. of morphine.

It is evident that when 0.5 mg. of prostigmine methylsulfate is administered with morphine there is only a slight change in the pain threshold curve. When the prostigmine methylsulfate is given ninety minutes after the morphine there appears to be a rapid decrease in the threshold.

Fifteen patients who had been addicted to but had received no regular doses of narcotics for at least six months were tested with 20 mg. of morphine plus 1 mg. of prostigmine methylsulfate and 20 mg. of morphine for comparison. At least two weeks elapsed between successive doses. In about half of this series the morphine was given first and in the rest the combination was first tested. In many instances the entire test was repeated, always with intervals of two weeks between doses.

Chart 2 shows the comparative mean threshold raising effects of the two drugs. It has been shown [3] that in general a person who has previously been addicted

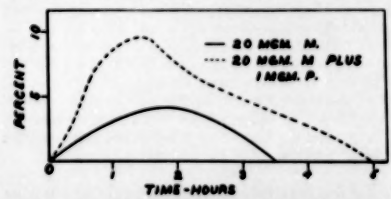

Chart 2.—Pain threshold raising effect in former addicts. There is a definite potentiating action, but the effect is still abnormally low.

shows a greatly reduced response to the pain threshold raising effect of a dose of morphine. It is evident that there is an enhanced effect when prostigmine methylsulfate is added to the morphine, but the mean curve is still abnormally low.

3. Unpublished data.

Two prisoner patients, who volunteered for the study, were used to test the development of tolerance to repeated doses. Each received four doses of morphine daily and, within limits, was allowed to increase his dose as tolerance developed. One received only morphine while the other received either 0.25 or 0.5 mg. of prostigmine methylsulfate with each injection. The 2 men increased their doses at about the same rate, 1 reaching a daily dose of 220 mg. on the fifty-sixth day and the other 200 mg. on the fifty-eighth day. Measurements of the pain threshold raising effect were made at intervals, the amount currently chosen by the patient being used as the test dose.

It is interesting that both men so increased their doses that the magnitude of the pain threshold raising effect remained approximately constant. The area under each of the percentage rise-time curves was measured with a planimeter to obtain the total effect of the dose in percent hours. To eliminate the factor of variable dosage each area thus obtained was divided by the dose used to obtain the effectiveness of that particular dose. This will then be expressed in percent hours per milligram. When the logarithm of these figures is plotted against the time of administration, a nearly linear relationship is obtained (chart 3). The slope of these lines is a measure of the rate of developing tolerance. It can be seen that there is a slight difference in favor of the combined medication, but in view of the fact that only 1 subject was used it seems probable that there is no significant difference in the rates at which tolerance developed.

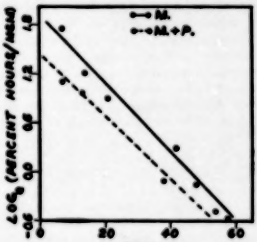

Chart 3.—The development of tolerance with repeated doses. The natural logarithm of the effectiveness of each dose tested is plotted against the corresponding number of days the drugs had been administered.

COMMENT

Most of the results reported here are on small groups, but in view of the possible dangers attending administration of morphine it seemed undesirable to make these groups larger. It appears from the results that there may be a slight increase in the effectiveness of morphine when prostigmine methylsulfate is added, but in every test this effect was small and of no practical importance. If prostigmine methylsulfate had a strong potentiating action, such for example as doubling the morphine effect, it would seem that this would have been observed even with the present small groups. The greatest potentiation was observed in the former addicts, but this group has been shown to react abnormally to morphine, and even here the effect is not great enough to be of practical importance.

It must be remembered that the clinical relief of pain by morphine is probably the resultant of several effects, the pain threshold raising action being only one of the components.[4] The reaction to pain, presumably reduced by opiates, is difficult to quantify and has not been considered in the present study.

4. Wolff, H. G.; Hardy, J. D., and Goodell, H.: Studies on Pain: Measurement of the Effect of Morphine, Codeine, and Other Opiates on the Pain Threshold and an Analysis of Their Relation to the Pain Experience, J. Clin. Investigation **19**: 659 (July) 1940.

CONCLUSION

It appears that the combination morphine-prostigmine methylsulfate is not significantly more effective in raising the pain threshold than morphine alone and that the addition of prostigmine methylsulfate does not appreciably change the rate at which tolerance is developed.

Clinical Notes, Suggestions and New Instruments

TORULA HISTOLYTICA MENINGOENCEPHALITIS

RECOVERY FOLLOWING BILATERAL MASTOIDECTOMY AND SULFONAMIDE THERAPY: PRELIMINARY REPORT

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Human infection with the various pathogenic yeasts is not of frequent occurrence. This is particularly true of torulosis, which must be classed as an extremely rare disease. When it is considered that the torulae are found on normal skin, in the human throat and gastrointestinal tract, in milk, on various plants and in the bodies of many insects, as pointed out by Wade and Stevenson,[1] it is surprising that infection does not occur more often. When it has occurred, however, it has usually been fatal.

While in most of the cases reported there was involvement of the central nervous system, a few presented localized involvement in other parts of the body. In these cases the mortality has not been so great. Brewer and Wood,[2] for example, reported healing of a localized abscess over the dorsolumbar spine following incision and drainage. A patient with a torular pelvic abscess observed by McGehee and Michelson[3] recovered following drainage and iodide therapy. Jones's[4] case presented involvement of the palate and nasopharynx and was considered arrested following curettage, administration of iodides and roentgen therapy. Gill[5] further discussed cases presenting involvement of the upper respiratory tract.

Reeves, Butt and Hammock[6] reviewed the literature on torulosis of the central nervous system up to 1941, collecting 73 cases and adding 6 of their own. Neither they nor Wade and Stevenson[1] were able to discover any in which recovery had occurred. During 1941, however, 3 instances of recovery, or at least of remission, of the disease were reported. Binford[7] reported the first of these: A man aged 41 was seen April 5, 1939, because of severe headache. After many examinations of the spinal fluid torulae were found, and treatment was limited to repeated lumbar punctures. On March 1, 1940 he was still having occasional headaches, with stiff neck and 250 cells per cubic millimeter in the cerebrospinal fluid. At this time, torulae were not observed on direct examination, but a guinea pig died of torulosis following inoculation of the fluid.

The second case was reported by Toone.[8] A Negress aged 18 was given potassium iodide on her first admission and was discharged improved two months later. After an interval of eighteen months she was readmitted because of headache. The cerebrospinal fluid was under a pressure of 330 mm. and contained torulae on direct examination.

The third patient, treated by Reeves, Butt and Hammock,[6] was a girl aged 15. In addition to evidence of disease of the central nervous system she also had empyema thoracis, for which an operation had been done, and a draining sinus persisted in the chest. She was admitted to the hospital on four occasions, on one of which exploration for brain abscess was carried out but none was found. She was given torula antigen and sulfapyridine. She was definitely improved following her last hospital stay and was able to get about, although small numbers of torulae could still be found.

In a case reported by Stiles and Curtiss[9] sulfanilamide was given as a last resort, but the patient died the following day.

Since none of the cases mentioned can be considered as having been cured and since our experience with the sulfonamides was so dramatic, we believe that our case offers sufficient interest to warrant a report, which is considered preliminary.

REPORT OF CASE

D. C., a white girl aged 9 years, was admitted to St. Joseph Mercy Hospital Jan. 13, 1942 because of headache, fever, nausea and vomiting.

The parents had noted during the past five years that the child was deaf, and her teacher had placed her in the front row in the schoolroom. Otorrhea had never been present, and a cause for the hypacusis could not be assigned. She had pertussis at 6 years followed by asthma, which disappeared after the next frost. At 7 the tonsils and adenoids were removed, and following this procedure the deafness was even more noticeable. A few months after the operation she had mumps.

No further trouble developed until about Dec. 1, 1941, when she caught cold and complained of earache several times. The family physician examined the ears but found no abnormality and prescribed ear drops. She was kept in bed and was gradually improving when about December 20 her condition became worse, with high fever, cough, nasal discharge and and occasional attacks of pain in the ears. A diagnosis was made of influenzal pneumonia. For a week she remained quite ill and then began to improve.

On the night of Jan. 1, 1942 she had a disturbing "nightmare," which was followed by severe frontal headache. The mother noted the following morning what she thought were a few drops of pus on the child's pillow, which she assumed came from the left ear. At no time, however, was pus visible in either canal. The headaches became worse daily, and sedatives were required constantly. Frequently the child would cry out loudly with the pain, holding her head in her hands. Three days prior to admission she began to be nauseated and vomited frequently. During the twenty-four hours previous to admission she was unable to hold anything on her stomach, vomiting, in fact, when the stomach was entirely empty. She had become extremely irritable in the ten days prior to admission, and the mother had noted a decided change in her personality and mental acumen. No complaint relative to the ears had been made during this time, and there was no swelling or tenderness behind the ears.

On examination January 13 the patient appeared to be exceedingly ill. The skin was dry and hot and the lips were covered with sordes. The cheeks were flushed and the eyes had an anxious expression. The child was apathetic most of the time, but on any attempt at examination would cry out loudly and insisted on having her mother with her constantly. On being questioned about the pain she passed her hand over her forehead but denied that there was any pain either in or behind the eyes.

The nares were clean. The septum was straight. The turbinates were slightly congested but no obstruction of the nasal fossae existed. A small amount of mucopurulent secretion was present in the posterior ethmoid region on both sides. The tongue was dry and heavily coated. The teeth were

From St. Joseph Mercy Hospital.

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3. McGehee, J. L., and Michelson, U. D.: Torula Infection in Man, Surg., Gynec. & Obst. **42**: 803 (June) 1926.
4. Jones, E. L.: Torula Infection of the Nasopharynx, South. M. J. **20**: 120 (Feb.) 1927.
5. Gill, W. D.: Torula Mycosis in Man with Special Reference to Involvement of the Upper Respiratory Tract, with Case Reports, Tr. Am. Laryng., Rhin. & Otol. Soc. **40**: 247, 1934.
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normal. The pillars were scarred and the tonsils surgically absent. A few small glands were present in the neck but none were tender. The right external auditory canal was clean, but the drum membrane had a peculiar appearance. It was thin, transparent and gray but had no luster or cone of light. The short process was visible, but posterior to this the membrane seemed to fade into the posterior-superior canal wall, which appeared to be definitely sagged. No perforation or discharge was noted. The left external canal was red, and a small amount of caseous material was noted in the fundus of the canal. Definite sagging was noted and no landmarks could be made out. The drum membrane was red, but no perforation could be seen. No tenderness or swelling was present over either mastoid. Hearing tests were difficult because of the lack of cooperation, but it was apparent that the child could hear a whisper at about 3 feet in both ears. Nuchal rigidity was not present, but the Kernig sign was slightly positive. The eyegrounds revealed papilledema, with scattered retinal hemorrhages.

Roentgen examination revealed normal paranasal sinuses. Both mastoids revealed clouding of all cells, with halisteresis and central softening.

A diagnosis of coalescent mastoiditis, masked and bilateral, with probable localized meningitis and extreme dehydration was made.

The patient was admitted to the hospital at once and placed on a regimen of hydration for thirty-six hours. On January 15 the left mastoid was opened. All of the cells were diseased and filled with a thick, stringy mucopus, which was later reported to be sterile on culture. The tegmen antri was partially destroyed, and through the perforation a dural granuloma about 5 mm. in diameter extended into the antrum. A small amount of pus was present in the granuloma. The dural plate was removed widely in all directions around the perforation until normal dura was seen. On palpation, the dura was as tense as a tennis ball, giving evidence of a very high intracranial pressure. The sigmoid sinus plate was apparently normal, and the sinus was not exposed. After all cells were cleaned out and the tip was amputated the wound was filled with 4 Gm. of sulfanilamide powder and closed in layers. A small Penrose drain was led out at the tip. After a dressing was applied lumbar puncture was done. The fluid came out in a stream under great pressure, which was impossible to measure, since it ran out the top of the manometer (540 mm.). About 30 cc. of clear fluid was removed, after which the pressure was normal.

As soon as the child had reacted she was placed on sulfadiazine therapy under the impression that the findings in the mastoid explained the symptoms and that sulfonamide therapy would prevent the localized meningitis from becoming general. The following day the temperature rose to 101 F. rectally and the child was drowsy. There was definite nuchal rigidity and the Kernig sign was positive. On January 17 Dr. S. C. Howard, director of the laboratory, reported that the cerebrospinal fluid showed large numbers of yeast cells on direct smear of the centrifuged sediment. These were doubly refractive budding forms which he identified as Torula histolytica. A spinal tap on the same day revealed clear fluid, again under great pressure and containing large numbers of torulae, which were later grown on culture.

January 20 the child seemed much improved. She had no headache, stiff neck or positive Kernig sign. The mastoid wound was healing, with all drainage and sutures out. The canal was dry. The question now arose as to the disposition of the right mastoid, since, according to the literature, the prognosis was hopeless. It was decided, however, that everything that was possible should be done for the child, in spite of the dark outlook. In addition, there was the remote possibility that the mastoids might have been the focal origin of the disease.

Consequently, on January 21 the right mastoid was operated on and found to be diseased, as was the left, with the exception that no dural granuloma had formed. Tissue was removed from the mastoid and later reported as chronic granulation by Dr. Howard. No torulae were seen. A spinal puncture was done at the conclusion of the operation and the pressure was found to be normal. Cultures of the spinal fluid taken at this time and planted on special mediums failed to show any growth at the end of three weeks.

Following the operation the patient's condition was downhill for three days, and the parents were advised of the prognosis. January 25, however, she lost her drowsiness and began to improve. The ears healed and the general condition appeared satisfactory. Sulfadiazine was continued after the second operation but was stopped on February 2, when she was discharged from the hospital. At this time she was afebrile; the ears were dry and the mastoid wounds healed. She had no headache, stiff neck or positive Kernig sign and her excessive irritability had disappeared. Her mother believed that her mental reactions were quite normal. The hearing was essentially normal in both ears.

On February 5, however, the child was returned to the hospital with the same symptoms for which she had originally been admitted—headache, nausea, vomiting and a regressive personality change. She was uncooperative and resisted all attempts at examination. The temperature was 100.4 F. She complained of diplopia whenever she looked at an object more than 3½ feet away. Nystagmus could not be made out. The neck was not stiff, but the Kernig sign was slightly positive. Both auditory canals were clean and the mastoid wounds were healed. Spinal puncture released fluid (clear) under a tension of more than 600 mm. Fifteen cells per cubic millimeter were present, mostly lymphocytes. Torulae could not be identified either on direct examination, culture or animal inoculation.

It was obvious that our optimism in discontinuing medication and discharging the patient three days previously had been excessive. Therefore she was put back on sulfadiazine therapy and by February 7 the headache, fever, nausea and vomiting had disappeared. The mental condition was slowly returning to normal. There were still evidences of choked disk and retinal hemorrhages in both eyes, but it was not felt that these were any worse. On February 12 another lumbar tap was done, and clear fluid under more than 600 mm. of pressure was obtained. After 20 cc. was removed, the pressure dropped to 170 mm. Only 8 cells per cubic millimeter were present, but no torulae were seen either on smear or on culture.

With no guidance from the literature in regard to further therapy, several authorities on the sulfonamides, including Dr. Perrin Long of Baltimore, were consulted. It was decided to keep the child on sulfadiazine for a total of six to eight weeks, if possible. A dose of 0.5 Gm. every four hours had been found sufficient to keep the blood level at about 6 per cent and the spinal fluid level at 4.75 to 5 per cent.

On February 16 the girl was discharged from the hospital, although the same dosage of sulfonamide was continued at home. She returned to the clinic twice a week for blood examinations and general observation. Spinal taps were done on February 19 and 27 and on March 9, and at each instance a pressure of more than 600 mm. was found, although less was needed to reduce the pressure to normal at each succeeding tap. After this, with improving vision and clearing of the retinal hemorrhages, it was considered unnecessary to continue the punctures further.

On March 21, she began to show a drop in the total number of white cells and in the percentage of granulocytes, and the sulfadiazine was discontinued after forty-four days of continuous administration. In the belief that it might be advisable to continue some form of medication, potassium iodide was prescribed, which she is still taking and probably will continue to take for another two months on a purely empirical basis.

The child remained symptom free until April 26, when an acute infection of the upper respiratory tract developed. She was kept in bed at home but on April 30 began to complain of pain in the right ear and mastoid region. There were redness and swelling in the mastoid wound, but since there was no evidence of abscess formation she was placed on sulfadiazine therapy. In three days, the pain, swelling and fever subsided and surgery was not necessary. No headache or stiff neck was present at any time, and it was not felt that the symptoms were due to an exacerbation of infection in the brain and meninges. The child was discharged from the hospital on

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May 2 and has been well ever since. At the present time (June 5) she is up and about as usual, with no evidence of disease.

COMMENT

At the first examination it was felt that this was a relatively simple case of masked, bilateral mastoiditis with localized meningitis. The finding of torulae came as a distinct surprise and called for a complete reevaluation of the case. It was thought that the torulae might have reached the meninges via the mastoids, but this opinion had to be abandoned in view of the complete absence of the yeast in either culture or histologic study of tissue from the mastoid. Consequently it came to be believed that the mastoid infection was a purely coincidental affair, possibly antedating but having little or no influence on the meningoencephalitis. The history of deafness was interesting, but after healing of the mastoid wounds tests showed practically normal hearing. No attempt is made to evaluate this portion of the history. The decided changes in the child's mental reaction following sulfadiazine therapy were most interesting, as was the regressive change following the discontinuance of the drug after the first admission. The absence of torulae in the spinal fluid since about February 1, along with clinical recovery, leads us to the hope that the child may be completely cured. This is further borne out by the fact that she recently passed through an acute infection of the upper respiratory tract with no signs of an exacerbation of the encephlaitis.

Evidence that mycotic infections as a class may be treated successfully by the sulfonamides is offered by Poulton,[10] Walker,[11] Bailey,[12] Miller and Fell,[13] Dorling and Eckhoff,[14] Ogilvie [15] and Dobson, Holman and Cutting,[16] in whose cases complete recovery from abdominal actinomycosis followed sulfonamide therapy. Several of the patients had been treated by the usual methods, such as surgery, iodides and roentgen rays, and were losing ground. Healing promptly followed the institution of sulfonamide therapy. Recovery from actinomycosis involving the cervicofacial region and thorax has been reported by Dobson, Holman and Cutting,[16] Morton,[17] Sudler and Johnson [18] and Jorge, Browne and Mealla.[19]

In addition, Hemmens and Dack [20] reported cure in rabbits of otherwise fatal experimental infections with Bacterium necrophorum, a close relative of the Actinomyces, following sulfonamide therapy. Van Bree [21] reported recovery in a case of moniliasis, Schroeder [22] in one of malignant blastomycosis and Dixon [23] in one of Madura foot (Actinomyces madurae) as a result of the same treatment.

It is therefore evident that another large and serious group of diseases, the mycoses, may be amenable to sulfonamide therapy. One has a distinct feeling that the high mortality of the past will give way to a much better experience in the near future.

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Special Article

HANDBOOK OF NUTRITION: XIV

UNUSUAL FOODS OF HIGH NUTRITIVE VALUE

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These special articles on foods and nutrition have been prepared under the auspices of the Council on Foods and Nutrition. The opinions expressed are those of the authors and do not necessarily reflect the opinion of the Council. These articles will be published later as a Handbook of Nutrition.—ED.

The successful prosecution of this war, as stressed by Herbert Hoover [1] during World War I, imposes a responsibility on the food exporting countries of the world; namely, that of providing adequate supplies of food for themselves and for their allies. There is no practical way to get food to any part of western Europe now except Great Britain without postponing the winning of the war, but when the war is won the additional gigantic problem will arise of finding food for much of Europe and for Asia. It is probable that many hundred million people will be starving then. It is presumed that half the populations of the occupied countries and Spain are starving now.

Vice President Henry Wallace [1a] has estimated that the wheat in storage in Canada, the United States, Australia and Argentina would cover the import requirements of Europe for nearly three years. The amount of corn on hand is presumably as great. However, wheat and corn alone will not suffice. Excellent as they may be as foods, the newer knowledge of nutrition teaches that several vitamins and some protein fractions which wheat and corn alone cannot supply are needed to provide for adequate nutrition. It teaches, indeed, that providing ample calories in a diet which is limited in certain nutrients intensifies the need for missing nutrients.

A cursory survey of any bibliography on foods reveals that almost every living thing has graced man's bill of fare at one time or another. It also is apparent that primitive peoples, as a rule, have been fortunate in their food selections. The diets of those nations of the world which are most advanced in technological achievement suffer by comparison. Technology directed at the food supply has not been wisely guided, and the result is not a happy one. The dramatic improvement in the death rate throughout the so-called civilized part of the world can only partly be explained by improved nutrition in some sections of these populations. It is mainly due to the application of medical science, especially the application of public health and hygiene. The increasing incidence of degenerative diseases and high incidence of decay of teeth suggest that average vigor in the more civilized races has declined.

The several hundred delegates who attended the Washington Nutrition Conference in May 1941 approved recommendations relating to requirements

From the Division of Medicine, Mayo Clinic.

1. Hoover, Herbert: The Food Armies of Liberty: The Winning Weapon—Food, National Geographic Magazine, September 1917.
1a. Wallace, H. A.: Foundations of the Peace, Atlantic Monthly **169**: 34-41 (Jan.) 1942.

for good nutrition submitted by the Food and Nutrition Board of the National Research Council. These recommendations were reached after a careful review of all the evidence available. Submitted as a table of recommended daily allowances for specific nutrients (table 1), they call for protein of a type found best in dairy products and in meat or fish, for calcium, for iron and for several vitamins at specific levels for varying age and activity. While cereals occupy an important place in food economy, to meet these higher standards of nutritional economy more liberal allowances of dairy products, meat, fish, fruits and green or yellow vegetables than formerly were considered necessary will be demanded.

Sir John Orr, scientific adviser on nutrition to the war cabinet in Britain, expressed the opinion that the "Washington nutrition yardstick," as he termed the market for dried skim milk is growing among commercial manufacturers of bread and several other processed foods, but a public demand for such a product has not existed. In the United States alone some fifty billion pounds of skim milk is largely wasted every year.[2] How much of this is simply thrown away is not known. Much is fed to animals, but this is waste because the nutrients in skim milk, pound for pound, equal those of muscle meat, and it appears that 10 pounds (4.5 Kg.) of the nutrients of skim milk is required to produce 1 pound (0.5 Kg.) of food nutrients in the form of pork.[3] Other less costly feed would do as well for hogs.

The quart of liquid milk a day for children and the pint for adults, as recommended in much nutrition teaching, is more than many family budgets will allow; but why insist on liquid milk? Milk can be distributed

TABLE 1.—*Recommended Daily Allowances for Specific Nutrients*
Committee on Foods and Nutrition, National Research Council

	Calories	Protein, Gm.	Calcium, Gm.	Iron, Mg.	Vitamin A,* International Units	Thiamine (B1),† Mg.	Riboflavin, Mg.	Nicotinic Acid, Mg.	Ascorbic Acid,† Mg.	Vitamin D, International Units
Man (70 Kg.)										
Moderately active	3,000	70	0.8	12	5,000	1.8	2.7	18	75	‡
Very active	4,500	"	"	"	"	2.3	3.3	23		
Sedentary	2,500	"	"	"	"	1.5	2.2	15		
Woman (56 Kg.)										
Moderately active	2,500	60	0.8	12	5,000	1.5	2.2	15	70	‡
Very active	3,000	"	"	"	"	1.8	2.7	18		
Sedentary	2,100	"	"	"	"	1.2	1.8	12		
Pregnancy (latter half)	2,500	85	1.5	15	6,000	1.8	2.5	18	100	400-800
Lactation	3,000	100	2.0	15	8,000	2.3	3.0	23	150	400-800
Children up to 12 years:										
Under 1 year §	100/Kg.	3-4/Kg.	1.0	6	1,500	0.4	0.6	4	30	400-800 ‡
1-3 years	1,200	40	1.0	7	2,000	0.6	0.9	6	35	
4-6 years ¶	1,600	50	1.0	9	2,500	0.8	1.2	8	50	
7-9 years	2,000	60	1.0	10	3,500	1.0	1.5	10	60	
10-12 years	2,500	70	1.0	12	4,500	1.2	1.8	12	75	
Children over 12 years:										
Girls, 13-15 years	2,800	80	1.3	15	5,000	1.4	2.0	14	80	‡
16-20 years	2,400	75	1.0	15	5,000	1.2	1.8	12	80	
Boys, 13-15 years	3,200	85	1.4	15	5,000	1.6	2.4	16	90	‡
16-20 years	3,800	100	1.4	15	6,000	2.0	3.0	20	100	

Tentative goal toward which to aim in planning practical dietaries; can be met by a good diet of natural foods. Such a diet will also provide other minerals and vitamins, the requirements for which are less well known. Reprinted from THE JOURNAL, June 7, 1941, page 2091.

* Requirements may be less if provided as vitamin A; greater if provided chiefly as the provitamin carotene.
† One mg. of thiamine equals 333 international units; 1 mg. of ascorbic acid equals 20 international units.
‡ Vitamin D is undoubtedly necessary for older children and adults. When not available from sunshine, it should be provided probably up to the minimum amounts recommended for infants.
§ Needs of infants increase from month to month. The amounts given are for approximately 6 to 8 months. The amounts of protein and calcium needed are less if derived from breast milk.
¶ Allowances are based on needs for the middle year in each group (as 2, 5, 8 and so on) and for moderate activity.

table of recommended daily allowances of specific nutrients, should receive official recognition in England and serve there as well as here as a guide in planning for nutrition. The table probably will also serve—it ought to serve—to guide what plans are made for feeding people everywhere. In that case the demand for milk, meat, fruits and other rich sources of the nutrients called for by the "yardstick" will tax resources to the limit. This raises questions whether foods now commonly available are used as economically as possible and whether foods not commonly in use but equally, or even more, nutritious could serve as supplements to common foods.

DAIRY PRODUCTS

Milk tops all lists of foods of high nutritious qualities, but wasteful practice enormously restricts its use for human food. Much milk is separated. The cream is used for making butter, and what is left is fed to animals or discarded. Until quite recently, only 12 per cent of the skim milk produced in the United States was used for human food. Objection to skim milk is mainly due to prejudice and is based on the erroneous conception that skimming removes the major value of the milk. A as dried whole milk for much less cost, and dried skim milk, which is relatively little perishable, could be sold for about a tenth the cost of liquid whole milk. The fats of milk, except for a content of vitamin A, are not superior to other less expensive fats, and vitamin A can be found in much less costly foods than milk.

Most diets not providing milk afford less calcium and less riboflavin than are called for by the recommendations of the Food and Nutrition Board, yet many persons dislike milk and never drink it. A great advantage of dry skim milk is that it can be mixed with other foods in cooking, so that the consumer gets it painlessly. Indeed, much more milk solids can be put in bread, cakes and puddings by using dry milk powder than when liquid milk is used. The water in liquid milk limits the amount that can be added. The taste of reconstituted dry milk is less attractive than that of liquid milk, but the taste of custards and other cooked foods made with dry milk differs not at all from, or is superior to, the taste of similar products made with

2. Consumer's Guide, U. S. Department of Agriculture, July 1939.
3. Abbott, J. S.: The Food Value and Economics of Skim Milk, Am. J. Pub. Health 30:237-239 (March) 1940.

liquid milk. Buttermilk is also highly nutritious, matching skim milk in its content of vitamins and minerals.[4] It also can be dried and thus distributed more economically.

The delicious taste of butter assures its marketing. However, to produce milk, as has been the custom, only for its butterfat has no advantage from the standpoint of nutrition and is grossly unsound economically, even for the producer.

Cheese mostly represents the casein in milk.[5] Superb as a food because of the high biologic value of its protein and because of its content of calcium, cheese could be more largely used with great advantage. Most persons like it, but city dwellers take too little of it. The European peasant makes much more of cheese. It represents a substantial portion of his diet, and large consumption of cheese undoubtedly contributes to the proverbial vigor of the pastoral peoples of Asia and the Balkans.

Left over from the milk when cheese is made is whey. The water of the milk is in the whey, but with it part of the protein—the lactalbumin—some of the mineral matter and most of the vitamins, yet whey is mostly thrown away by manufacturers of cheese. In late years dried powdered whey has found a place in poultry feeds and in candy manufacture. Much more dried whey could be used for human food, and none should be discarded. It is reported that in Germany no milk products may be thrown away and none may be used for feed without a special license.

Sugar is not among the recommended foods. Its recent rationing will not provoke a hardship, for sugar supplies nothing in nutrition but calories, and the vitamins provided by other foods are sapped by sugar to liberate these calories. One of the worst of the many bad food habits that Americans have acquired is their use of sweetened carbonated beverages. Many persons take such beverages by the half pint many times a day, with a resulting excessive consumption of sugar. The suggestion has been made [6] that whey after removing its protein be incorporated in these beverages. By such means the minerals and vitamins of whey could make these drinks nutritious.

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MEATS AND FISH

Next to the dairy products on the list of better foods come meat and fish, but in their use economy has been neglected. There is no evidence that the nutritive value of muscle meat differs significantly from one part of the animal to the other, yet small food budgets are regularly taxed by purchases of expensive cuts when thrifty cuts would do as well.[7] Furthermore, the most nutritious parts of every carcass are seldom chosen by the customer and go to making fertilizer or feed. The blood, lungs, stomach, liver, pancreas, kidney, brain and heart are spurned by many persons. In southern China a suitable gift for a prospective mother is a pair of pig's feet. She will hope by the time the baby is born to have accumulated perhaps two dozen pairs to help support her demand for calcium during lactation.[8]

In the first world war the complaint was made by Reese [9] that Americans had acquired "a lot of silly ideas" about what is fit for food and what is not. Thereupon Reese advocated the use of certain reptiles, such as turtles, lizards, snakes and even alligators. A happy habit of more primitive man was to devour whatever could be eaten in the carcass of his kill. He thus obtained the organ meats as well as muscle. The Navajo, for example, who in contrast to many other Indian groups has retained his vigor despite proximity to the white man's civilization, consumes all vestige of the sheep or goat he kills and exhibits a decided preference for the contents of the abdomen.[10] He eats the organs first. The modern American credits the ancient Greeks with a high state of culture, yet Cornwall [11] found references in the Odyssey to many foods men spurn today—foods such as roasted entrails and goat's stomach filled with blood. There is current discussion of deficiency of certain lipoids in the diet of more civilized races. A return to these food habits of the ancient Greek and modern Navajo would at once correct such dietetic error, for the lipoid content of organ meats such as liver is high. Much could be done to improve the nutritive quality of processed meats by including in them organ meat and blood. Blood sausage (blutwurst) is popular in Germany. The dog food manufactured by American packers, containing much of what they designate as offals, is demonstrably superior in nutritive value to most of the meat they can for human food.

The nutritive values of fish are as high as those of meat, except perhaps for iron.[12] The livers of many fish besides the cod are rich in vitamins A and D; also the body oils of fish contain these vitamins. The flesh of fish is also rich in vitamins of the B groups to such an extent that Goldberger and Wheeler [13] found salmon to be effective for preventing pellagra. However, many fish equal in nutritive value to fish that are popular in American markets are neglected, notably the carp. Smoked carp is a delicacy in Europe, and carp culture in Germany is an industry of importance. Raising carp is said to be as profitable as raising pigs. American streams and fresh water lakes are full of rough fish which could be utilized for human food.

The huge oyster shell mounds of the Atlantic coast seem to testify that the aboriginal American made more use of oysters than happens now. A nutritional advantage in the oyster, which applies also to the clam, the lobster, the crab and the shrimp, is that it is eaten whole, so that the valuable nutrients of the internal organs are obtained. Pease [14] maintained that the nutritive value of oyster meats is a little higher than that of cow's milk, owing to a high content of calcium, iron and other minerals and all the vitamins.

Fairchild,[15] on a tour of the world, found giant snails as large as a man's fist offered for sale in Ceylon and Africa. They were considered a delicacy. He thought they might be raised in the Everglades of Florida for consumption in America.

4. Hutchison, Robert: Hutchison's Food and the Principles of Dietetics (Revised by V. H. Mottram and George Graham), ed. 9, Baltimore, Williams & Wilkins Company, 1940.

5. McCammon, R. B., and Kramer, M. M.: Nutritive Value of Various Types of Cheese, J. Am. Dietet. A. **9**: 292-294 (Nov.) 1933.

6. Wilder, R. M.: Nutrition in the United States: A Program for the Present Emergency and the Future, Ann. Int. Med. **14**: 2189-2198 (June) 1941.

7. A useful pamphlet is that issued by the American Meat Institute, Chicago, entitled "Buying Guide for the Thriftier Cuts of Meat." The statements in the pamphlet were approved by the Council on Foods and Nutrition of the American Medical Association.

8. Rose, Mary S.: Racial Food Habits in Relation to Health, Scient. Monthly **44**: 257-267 (March) 1937.

9. Reese, A. M.: Reptiles as Food, Scient. Monthly **3**: 545-550 (Dec.) 1917.

10. Carpenter, T. M., and Steggerda, Morris: The Food of the Present Day Navajo Indians of New Mexico and Arizona, J. Nutrition **18**: 297-305 (Sept.) 1939.

11. Cornwall, E. E.: What the Ancient Greeks Ate, Ann. M. Hist. **3**: 30-33 (Jan.) 1937.

12. Sherman, W. C.; Elvehjem, C. A., and Hart, E. B.: Further Studies on the Availability of Iron in Biological Material, J. Biol. Chem. **107**: 383-394 (Nov.) 1934.

13. Goldberger, Joseph, and Wheeler, G. A.: A Study of the Pellagra Preventive Action of Canned Salmon, Pub. Health Rep. **44**: 2769-2771 (Nov. 15) 1929.

14. Pease, H. D.: The Oyster—Modern Science Comes to the Support of an Ancient Food, J. Chem. Educ. **9**: 1675-1712 (Oct.) 1932.

15. Fairchild, David: Exploring for Plants, New York, Macmillan Company, 1930.

For mention also without prejudice is the possibility of finding protein foods among the insects. Wakefield and Dellinger,[16] in the feces of pre-Columbian bluff dwellers of the Ozarks, found residues of insects. A modern primitive, the Bushman, considers appetizing the eggs of termites.[17] Verrill [18] has written that the grasshopper and the cricket were periodically important as foods for the Indians of the western plains, and in the West Indies a large white grub found in the pith of palm trees serves as food. These grubs when toasted are said to taste like roasted chestnuts. Even the ancient Hebrews, strict as they were in their choice of foods, looked with favor in times of famine on the locust.[19] The nutritive value of insects must be high. The taste may not be bad. Insect culture might some day become a part of food economy.

Should the time ever come when the land fails to provide enough good protein to meet all human needs, an unlimited supply can be found in the sea. The catch of fish has limitations, but ubiquitous in the oceans is the zooplankton, which could be harvested and would provide a first class human food. However, the technical difficulties involved are rather overwhelming. The estimate has been made by Clarke [20] that the human requirement for calories for one individual could be met only by all the plankton in a volume of water "equal to a football field filled to a depth of a meter and a half."

More practical than plankton as a source of proteins is the micro-organism yeast. A by-product now and mostly thrown away by brewers, yeast could be grown in limitless amounts. Dried yeast is largely protein, 40 to 55 per cent. Most of the nitrogen free remainder is material consisting of a mannose polysaccharide. The amount of fat is small, from 1 to 3.5 per cent, but this is rich in steroids. The content of vitamins of the B complex is very high; some vitamin A is present and much ergosterol, which by ultraviolet irradiation can be changed to vitamin D. This is important because almost no foods other than fish liver oils provide significant amounts of vitamin D. Among the amino acids found in the proteins of yeast are alanine, valine, phenylalanine, glutamic acid, aminoacetic acid, leucine, oxyproline, aspartic acid, cystine, methionine, tyrosine, proline and tryptophan. The percentage of these ranges from 10 down to 0.5 in the order given. The diamino acids present include lysine 10 per cent, arginine 5 per cent and histidine 5 per cent.[21]

Some brewers' yeast is on the market now, sold mainly as a source of vitamins. The armed forces are receiving yeast in peanut butter as an optional spread for bread. The yeast taste is disguised by that of the peanut. Analysis of samples of such yeasted peanut butter (20 per cent) indicates a composition of approximately 32 per cent protein. The samples contain per gram around 30 micrograms of thiamine, 16 micrograms of riboflavine and 250 micrograms of nicotinic acid. Thus an ounce (30 Gm.) of such peanut butter should provide about 10 Gm. of valuable protein, about half the recommended daily allowances of thiamine and nicotinic acid and a fifth of the recommended daily allowances of riboflavin.[21]

Two products, mixtures of vegetables and brewers' yeast, are listed in Accepted Foods.[22] Bakers' yeast also has virtue as a food for persons who can eat it without abdominal distress. It is much less rich in thiamine than brewers' yeast; also some question remains as to the utilization by man of the vitamin B complex in fresh yeast.[22a] A high thiamine bakers' yeast has recently been made available to fortify the dough of enriched bread.

The bitter taste of yeast and some aftertaste present complications to the use of yeast as food, but these objectionable qualities can be overcome. Some special yeasts have very little bitterness, and autolyzing yeast provides a product with a taste like meat. The possibilities of yeast as human food deserves more technological attention. Two major defects in many modern diets are relatively small provision of certain vitamins of the B complex and insufficiency of biologically superior protein. Both deficiencies could be limited by using yeast as food.

FRUITS

Another basic nutrient deficient in many diets is ascorbic acid, vitamin C. The trouble mainly comes from lack of fruit in diets, especially lack of citrus fruits. The tomato is good as a source of ascorbic acid, but many fruits such as apples and pears, most of the vegetables, milk and meat are far from rich as sources of this vitamin. However, citrus fruits and tomatoes, while grown abundantly in certain sections, are bulky, perishable commodities and hence expensive to distribute. Ascorbic acid can be made synthetically at relatively small expense, and it may prove to be desirable to add the synthetic vitamin to jellies, jams and other fruit preserves in such amounts as to bring the final content of ascorbic acid to that of ripe tomatoes.

Among less common foods which are rich in ascorbic acid is the black currant. Two ounces of black currants, cooked, according to Olliver,[23] will meet an individual's vitamin C requirements. The reference probably applies to minimal requirements. Consumed raw, watercress and strawberries are good sources of ascorbic acid, providing approximately 60 mg. per hundred grams. The edible hips of the wild rose are becoming famous for their content of this vitamin.[24] Thone [25] has suggested that the hip could be increased in size and developed commercially. Verrill,[18] whose thesis is that North Americans should use more foods from South America, mentioned some of the unusual tropical fruits now on sale at a few exclusive markets in this country. They include the mamey, sapodilla, silkana, ceriman, papaya, anona, soursop, star apple and guava. Papaya has recently been suggested as a substitute for orange in Hawaii, as well as home made guava juice.[25a] Guava has an especially high content of ascorbic acid. Goldberg and Levy [26] found

16. Wakefield, E. G., and Dellinger, S. C.: Diet of the Bluff Dwellers of the Ozark Mountains and Its Skeletal Effects, Ann. Int. Med. **9**: 1412-1418 (April) 1936.
17. Altshuler, S. S.: The Historical and Biological Evolution of Human Diet, Am. J. Digest. Dis. **1**: 213-218 (May) 1934.
18. Verrill, A. H.: Foods America Gave the World, Boston, L. C. Page & Co., 1937.
19. Dor: Explication zoologique des prescriptions alimentaires de la Bible et du Halmud, Bull. et mém. Soc. d'anthrop. de Paris, series 8, **8**: 63-70, 1937.
20. Clarke, G. L.: Plankton as a Food Source for Man, Science **89**: 602-603 (June 30) 1939.
21. Anheuser-Busch, Inc.: Personal communication to the authors.
22. American Medical Association Council on Foods: Accepted Foods and Their Nutritional Significance, Chicago, American Medical Association, 1939.
22a. Parsons, Helen, and others: Utilization by Man of the Vitamin B Complex in Fresh Yeast, Federation Proceedings, vol. 1, part II, p. 129, March 16, 1942.
23. Olliver, Mamie: Antiscorbutic Values of Fruits and Vegetables, Lancet **2**: 190-192 (Aug. 17) 1940.
24. Lorwenfeld, Claire: Vitamin C from Rose Hips, Brit. M. J. **1**: 988-989 (June 21) 1941.
25. Thone, Frank: Wealth from Weeds, Science News Letter **40**: 166-167 (Sept. 13) 1941.
25a. The Child, Monthly Bull. U. S. Dept. Labor, Children's Bureau, March 19, 1942, p. 292.
26. Goldberg, Leon, and Levy, Leopold: Vitamin C Content of Fresh, Canned and Dried Guavas, Nature, London **148**: 286 (Sept. 6) 1941.

300 to 400 mg. in each hundred grams of the fresh fruit, and on drying the guava fruit they obtained a powder of pleasant aromatic odor and practically no taste, with the rather phenomenal quantity of 2,500 to 3,000 mg. of ascorbic acid for each hundred grams. A monograph on the guava is now in preparation by Webber of the California Agriculture Experiment Station.[27]

VEGETABLES

An important reason for the great amount of emphasis that nutritionists have placed on green and yellow vegetables is the content of beta-carotene in spinach, carrots, beet greens and other colored plants and roots. There is widespread misconception to the effect that chlorophyll has a place in animal nutrition. There is no evidence to support such a view. Carotene alone and not the chlorophyll of plants is converted in the animal organism to vitamin A. Few foods provide vitamin A ready made. Butter and fish liver oils are about the only sources. Butter may be excellent as a source or only fair, depending on the feed supplied the cow. Assays run from less than 2,000 to more than 40,000 international units to the pound. The daily allowance of vitamin A for an adult man, as recommended by the Food and Nutrition Board of the National Research Council, is 5,000 units, and one of the greatest services the dairy industry could perform would be to standardize the vitamin A content of butter at some high level.

Interference with the fisheries of the world by the war has again directed attention to sources of carotene. Plant oils contain no preformed vitamin A and but little carotene. However, the pulp of certain yellow vegetables is very rich in carotene. An estimate by Barnett [28] suggests that 10,000 acres planted in carrots would yield 20 trillion units annually of vitamin A. This would amount of 4 billion daily human requirements, or enough to last a population of 100 million persons forty days. Another good source of carotene is the sweet potato, a prolific grower.

Many vegetables little known in North America deserve attention by the food economist. Some could be developed with advantage. The taro, for example, has a subterranean stem resembling the potato. The yield per acre is two to four times that of the potato and, measured in calories, may be ten times that of rice.[29] Taro is a common food in mid-Pacific islands, in parts of southern Asia and in South America. Varieties known as dasheens have been cultivated commercially in parts of the United States.[30] Taro in Hawaii is mostly eaten as a paste called poi. Fermented poi keeps well without refrigeration. Another vegetable of the tropics said to be high in nutrients is the breadfruit.[31] Others are yautias or taniers, which serve importantly as food for the natives of the West Indies, and yuca, the edible root of the cassava plant, the source of tapioca. Widely used for food today in South America, as mentioned by Verrill,[18] and cultivated by the Incas of Peru before the white man came, are the canna, the leren, the arikuna, the papa lisa, the oca and the arracha, as well as the better known peanut, the potato and the sweet potato.

27. Webber, H. J.: Personal communication to the authors.
28. Barnett, H. M.: Plenty of Vitamin A Is Available for the United States, Science News Letter 40:185 (Aug. 9) 1941.
29. Potgieter, Martha: Taro (Colocasia esculenta) as a Food, J. Am. Dietet. A. 16:536-540 (June-July) 1940.
30. Young, R. A.: The Dasheen: A Southern Root Crop for Home Use and Market, U. S. Department of Agriculture, Farmer's Bull., June 1924, No. 1396.
31. Vaughan, W. T.: An Introduction to Tropical Foods, J. Am. Dietet. A. 16:110-116 (Feb.) 1940.

Use of grass for human food again has come up for consideration since the present war began. Nebuchadnezzar was compelled to "eat grass as oxen" to atone for many sins. However, the benefit he derived, if any, was largely spiritual. The value of a food, as emphasized by Graham Lusk [32] before World War I, depends mainly on the ratio of nutritive to non-nutritive components. Due consideration must be paid to a few special requirements, such as that for vitamin C. The citrus fruits and tomatoes, for example, although bulky, are of great importance in nutrition because of their content of ascorbic acid. Lusk once missed this point, as he later acknowledged.[33] He called tomatoes colored water, but by and large his early emphasis was right. The more nutritious foods are those with nutritive components high and non-nutritive components—namely, water and indigestible cellulose—low. Among the vegetables the tubers like potatoes and the legumes like peas and beans possess more of this quality than do the leaves of plants or grasses.

In times of famine, however, people will resort to whatever they can find to eat. In Russia, for example, in the last war not only grass but also the leaves and the bark of trees were eaten. In Germany and Russia enormous amounts of watery root vegetables, such as turnips, were consumed. In a population leaning too heavily on such foods, war edema is likely to develop. The type of protein obtained is poor and excessive water is ingested. Also the bulk of watery foods which needs to be ingested to contribute significantly to caloric requirements places an intolerable strain on the human intestine. The coarseness and amount of fiber some such foods contain may even interfere with absorption of what nutrients are present. The Germans as well as the Russians in the last war attempted to eke out dwindling supplies of flour by adding to this flour bran and chaff and even straw. By doing so they made bad matters worse. Nutrients diluted with large amounts of indigestible material are lost; they cannot be absorbed effectively.

Thus grass serves poorly as a human food. Even tender, leafy vegetables, valuable as a source of minerals and carotene, would not alone provide for human nourishment. Their protein would be inadequate and their water content excessive. However, all the leafy vegetables have a place as supplements to other foods, and tender young grass when dehydrated is excellent as a vehicle for several vitamins and salts. Such a product has been accepted by the Council.[34]

THE CEREAL GRAINS AND THE LEGUMES

Relative ease and low cost of production and high content of energy yielding nutrients explain why cereal grains, rice and also corn have long contributed importantly to the diets of people whose civilizations have been based on agriculture. Wheat has been developed more than other grains. In England a hundred years ago wheat alone contributed nearly half of all the calories of the diet. Its consumption has been halved, and yet today it provides more calories for the English speaking world than any other food.

Oat culture could be stimulated with considerable advantage. Oats can grow much farther north than wheat, and oats provide a somewhat more nutritious

32. Lusk, Graham: The Fundamental Basis of Nutrition, New Haven, Yale University Press, 1914, p. 42.
33. Lusk, Graham: Problems of Metabolism, in Lectures on Nutrition, Philadelphia, W. B. Saunders Company, 1924-1925, p. 62.
34. Cereal Grasses in Special and Therapeutic Diets, Kansas City, Missouri, Cerophyl Laboratories, Inc., 1940.

human food. The content of thiamine is higher and the protein is biologically superior. This explains the value of oats as feed for stock. Samuel Johnson's caustic commentary in his Dictionary that "oats in England is generally given to horses and in Scotland supports the people" illustrates how prejudice works hardships in nutrition. In England, then as now, just as in America, men were more concerned about good nutrition for their livestock than for themselves. The answer said to have been given to Samuel Johnson was "and where will you see such horses and such men." The Scots became a hardy race on oats. So did the early Norse. Oatmeal is often mentioned in the Sagas.[35]

Rye and barley are less popular than wheat in England and America. They are more used in Europe. Rye is not superior to wheat in nutritive qualities, and rye flour, like white wheat flour, is generally overmilled. Also what there is of rye in most so-called rye bread is usually diluted with white wheat flour.

TABLE 2.—*Analysis of English Diets for Adult Men*

	Calories	Protein, Gm.	Calcium, Gm.	Iron, Mg.	Vitamin A, International Units	Ascorbic Acid, Mg.	Thiamine, Mg.
Middle class diet today..	3,310	110	0.6	12.3	5,170	70	1.2
Poverty diet today.....	3,000	78	0.3	8.4	520	15	0.66*
Middle (artisan) class diet, 1926.....	2,130	125	0.2	45	1,270	0	1.77
Navy ration, 1811.....	2,750	110	0.7	18	2,600	0	3.15
St. Bartholomew's Hospital, 1698.....	2,000	80	1.9	12	5,100	10	1.80
Meat eating classes, fifteenth century.....	3,650	250	1.3	50	7,000	?	3.30
Peasant diet, fifteenth century.....	3,200	140	1.2	21	1,700	10-20	4.20
Recommended by Food and Nutrition Board†	3,000	70	0.8	12	5,000	75	1.8

From J. C. Drummond's "The Englishman's Food," London, J. Cape, 1940.

* A diet containing as little thiamine as this (0.22 mg. per thousand calories) provokes symptoms of severe athiaminosis. See Williams, R. D.; Mason, H. L.; Smith, B. F., and Wilder, R. M.: Further Observations on Induced Thiamine (Vitamin B_1) Deficiency and the Thiamine Requirement of Man, Arch. Int. Med. **69**:721-738 (May) 1942.

† For moderate activity.

Decortication of the grains by modern milling methods has been unfortunate from the standpoint of nutrition. The stone mills of the past left in the flour a large proportion of its vitamins. The flour was coarse and not very white, but in content of thiamine and nicotinic acid it far surpassed the finer flour of the roller mills. The latter came into general use some seventy years ago. The adequacy in certain vitamins, notably thiamine, of the diet of the populations of England and America—the adequacy especially of the diet of that part of the population of these countries which because of smaller purchasing power consumes much bread—was largely affected in consequence of technology applied to milling grains without the benefit of direction by a science of nutrition. There was no such science when these modern milling methods started.

The effect of roller milling on the thiamine content of American diets has not been estimated. Presumably, however, it was much the same as that in England. Drummond's[36] calculation of the nutrients contained in diets past and present is shown in table 2. The comparison reveals that the diet of the middle class Englishman in recent years, while supplying more vitamin A and more ascorbic acid, contains little more than a third as much thiamine as did the diets of the past. In other respects the differences are less significant. The greater use of green vegetables and fruits in recent times accounts for the increased supply of the vitamins A and C. The substitution, about 1870, of roller milled white flour for the coarser flour of the past and the increased use of sugar explain the smaller allowances of thiamine in the modern diet. The milling industry of the United States is thoroughly aware at last of the importance of retaining in flour more of the thiamine and nicotinic acid of wheat. This ultimately will be accomplished without loss of other qualities which people have come to like and to demand in flour. Until it is accomplished, which may take many years and involve perhaps a revolution in the milling industry, restorative additions of thiamine and nicotinic acid to white flour and bread should be demanded. Restoration to staples such as flour of nutrients removed in processing was recommended in 1939 by the Council on Foods and Nutrition of the American Medical Association.[37] The procedure as applied to flour and bread was later endorsed by the Food and Nutrition Board of the National Research Council. Flour now is standardized and controlled by the Food and Drug Administration. White flour which bears the label "enriched" must contain thiamine and nicotinic acid, as well as iron, in amounts which are believed to approximate those in flour as flour was milled a century ago.

The nutritional environment of enormous populations of the Orient, which largely depend on rice for food, also suffered badly from food technology applied without the benefit of science. Milling rice is much like milling wheat. The primitive milling methods removed the husks but left brown rice with much of the bran intact. The later milling methods removed the bran coats and with them much of the content of vitamins and salts. The later methods yielded so-called polished rice. An example of how misguided man can be was supplied by Hou,[38] who wrote that in the rice country of China where beriberi is endemic the quite nutritious soybean is used for field fertilization in the cultivation of the less nutritious rice. One can buy brown rice in American markets, but only at a premium. It spoils and hence its distribution costs are high. A better buy is what is called unpolished rice. Unpolished rice is said to retain about a half of the thiamine of brown rice. It keeps well and after cooking is almost as white as polished rice.

Food habits to a great extent depend on the availability of foods. The story of the pottage of lentils for which Esau, son of Isaac, sold his birthright to his brother Jacob suggests that lentils were more used in ancient times than now. In Germany lentil soup is still in favor, yet in nearby Belgium lentils, which were distributed in World War I, were spurned by people who were starving. There is no disputing the nutritional excellence of lentils. Likewise meritorious as foods are peanuts and soybeans.[39] The proteins of these legumes are biologically complete, superior to those of any of the cereals. The vitamins of the B complex and minerals are abundant. The Japanese eat fresh soybeans from bags like candy.[40] A popular food in Hawaii is miso, a fermented mixture of soybean

35. Gudjonsson, S. V.: Kost der alten nordischen Völker, Deutsche med. Wchnschr. **61**:1507-1510 (Sept. 20) 1935.

36. Drummond, J. C., and Wilbraham, A.: The Englishman's Food: A History of Five Centuries of English Diet, London, J. Cape, 1940.

37. Annual Meeting of the Council on Foods, J. A. M. A. **113**:680 (Aug. 19) 1939.

38. Hou, H. C.: Diet and Health in China, Chinese M. J. **59**:413-420 (Sept.) 1937.

39. Horvath, A. A.: The Nutritional Value of Soybeans, Am. J. Digest. Dis. **5**:177-183 (May) 1938.

40. Miller, C. D.: Japanese Foods Commonly Used in Hawaii, Hawaii Agricultural Experimental Station Bull., 1933, vol. 68.

and rice. The soybean is a staple in certain parts of China, and the statement freqently is made that in these regions beriberi and pellagra are unknown. In Germany, cultivation of the soybean and its processing for human food has become a major industry. A sausage known as bratling, made with skim milk and soybean, forms a mainstay of the German army ration.[41] In the United States the press cake that remains after expulsion of the oil from soybean, peanut or cottonseed is sold for feed or is discarded. The industries get their profit from this "premium oil," which in part is used for food, in part for other purposes. Yet the press cake contains nutrients which are almost, if not quite, as valuable as the nutrients of meat and can inexpensively be converted into soups and other very tasty foods. The cost of production of protein from soybean plants is little greater than a tenth the cost of production of meat protein, and the present relatively small annual crop of peanuts and soybeans in the United States would provide 70 per cent as much protein as does the meat supply.

CONCLUDING COMMENT

This very brief review will show that modern man could reconsider many of his food ways with immeasurable advantage. Greater and more economical use of milk and meat and the use of more organ meat and fish would help to raise the quality of diets. Some common foods can be improved and greater use of many uncommon foods would help provide more adequate nutrition. The world is full of food potentialities, and the anticipated demands for foods possessing superior nutritive qualities calls for a reevaluation of world supplies of food. The reevaluation, if based on the science of nutrition, should reveal the means of providing all that is required for the optimal nutrition of all the populations of the globe, which well may be prerequisite for world security and order.

Council on Physical Therapy

THE COUNCIL ON PHYSICAL THERAPY HAS AUTHORIZED PUBLICATION OF THE FOLLOWING REPORTS. HOWARD A. CARTER, Secretary.

AUREX MODEL C-B AND MODEL C-A HEARING AIDS ACCEPTABLE

Manufacturer: Aurex Corporation, 1115 North Franklin Street, Chicago.

The Aurex Model C-B (No. 20888) and the Model C-A (No. 20654) are alike in external features. The dimensions and weights of the various parts are as follows:

Microphone and amplifier unit: 5 by 2¼ by ⅝ inches, weight 4.55 ounces.

Crystal receiver without earpiece, 3/16 by 1 inch diameter.

Bone conduction receiver: 1⅜ by ⅝ by ⅜ inches, weight 0.32 ounce.

Two battery units were supplied, one having a 33 volt B battery, the other a 43.5 volt B battery. The former is 3¼ by 3¼ by 1¼ inches, weighing 10.9 ounces; the latter is 3¼ by 4 by 1¼ inches, weighing 14.4 ounces.

BATTERIES

Voltages and current drains:

A battery, General Battery Company, EP-600, 1.5 volts, 80 milliamperes.

B battery, unmarked, 33 volts, 0.7 milliampere.

B battery, unmarked, 43.5 volts, 1.3-1.4 milliamperes.

41. The Soya Bean, editorial, Brit. M. J. 2: 269-270 (Aug. 23) 1941.

ACOUSTIC GAIN

The instrument has a single volume control, a sliding contact on the side. Both instruments submitted have a fairly low internal noise level and are reasonably free from acoustic feed back difficulties. With a custom fitted ear mold they can be set to full volume without feed back squeal. The C-A No. 20654 unit is less subject to feed back than the C-B No. 20888. The following give the order of magnitude of the acoustic gains with various combinations:

C-B 20888 ¼ full volume with 33 volt battery	128	256	512-2,048	3,000	4,096
	Nil	Slight	30-40	24	11
C-A 20654 Full volume with 33 volt battery	Nil	Slight	27-45	24	16

Using the bone conduction receiver, a hard of hearing subject with conduction deafness having an average loss of 45 decibels reports that conversational speech is comfortably loud with either instrument set at one-half volume, using the 33 volt battery.

Aurex Model C Hearing Aid.

ARTICULATION TESTS

The usual word and sentence lists were used with hard of hearing subjects at a distance of 5 feet in a quiet room. These tests showed satisfactory performance with both instruments, using both the crystal receiver and bone conduction receiver.

MECHANICAL FEATURES

The instrument was found to be well made and shows no serious mechanical defects.

The Council voted to accept the Aurex Model C-B and Model C-A Hearing Aids for inclusion in its list of accepted devices.

LINDE OXYGEN THERAPY REGULATOR, TYPE R-85, ACCEPTABLE

Manufacturer: The Linde Air Products Company, Chicago.

When submitting the Linde Oxygen Therapy Regulator, Type R-85, for the Council's consideration, the firm stated as follows:

> This regulator was prepared in response to demands from physicians and others for a satisfactory device which would be less expensive than the other types of Linde Regulators accepted by the Council.
>
> The R-85 is a single stage regulator which embodies all the parts essential for proper operation and with the nonessentials and special finishes omitted. It has been listed as standard by Underwriter's Laboratories, and the parts are practically the same as those of successful industrial regulators.

(The Linde Oxygen Therapy Regulator, Type R-50, was announced as accepted in THE JOURNAL, June 11, 1936, page 130, and the Linde Oxygen Therapy Regulator, Type R-51, in THE JOURNAL, June 9, 1934, page 1941.)

Linde Oxygen Therapy Regulator, Type R-85.

In its examination, the Council found that the unit was compact. The materials of which the regulator is constructed and the manner of their assembly indicate sturdy construction and reliability.

The regulator was put in service with the oxygen therapy setup of a large hospital. There was no evidence of any failure of function.

The Council on Physical Therapy voted to accept the Linde Oxygen Therapy Regulator, Type R-85, for inclusion in the list of accepted devices.

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

535 North Dearborn Street - - - Chicago, Ill.

Cable Address - - - - "Medic, Chicago"

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SATURDAY, OCTOBER 17, 1942

SERUM SICKNESS AND ANAPHYLAXIS IN MAN

Kojis,[1] who recently studied a series of 6,211 cases in which horse serum was employed for various infections, suggests that mortality from anaphylaxis to serum is much greater than the incidence generally quoted from Park for this country (1 to 50,000) and from Pfaundler for Europe (1 to 100,000). Five fatalities were noted in the present series, a mortality rate of 1 in 1,042, or just under 0.1 per cent. Why serum sickness develops in some cases and not in others still remains a mystery. Contributing causes suggested by this study are the kind of serum, the preparation of serum, the quantity of serum, the horse producing the serum, the race of the patient, the route of administration, repeated injections and the patient. The most important influencing factors were the kind and the preparation of serum, repeated injections and the patient. The administration of an injection during serum sickness is particularly hazardous. Of 3 patients in this series who had injections 1 promptly died and another was made distinctly worse. For this reason recognition of serum sickness following injection is important. The classic symptoms begin with slight tenderness at the puncture point for about a day. After a few uneventful days, usually from the fifth to the tenth day, a rash develops suddenly. This rash, most often an urticaria, is frequently associated with edema, fever, adenopathy and polyarthritis.

The relation between serum sickness and serum anaphylaxis is extremely close, the only real difference being the time interval. As suggested by Cook, a reaction is one of anaphylaxis if it occurs within an hour or less after the administration of allergen. In this series there were 41 patients with anaphylactic shock. An important advance in prevention of serum sickness and anaphylaxis has been the improvement in the manufacturing of serums, particularly by the Parfentjev method of proteolytic digestion of serum by pepsin.

Kojis stresses the necessity of performing intradermal and conjunctival tests with horse serum each time the serum is administered, unless it is given daily. Thus, when the reaction to the intradermal sensitivity test was positive the incidence of serum sickness following inoculation with diphtheria antitoxin in his series was 4 times, of anaphylaxis 35 times and of mortality 11 times greater than when the reaction to the test was negative. If the reaction to the conjunctival test was positive the incidence of serum sickness was 5 times and of anaphylaxis 173 times greater. Secondary injections of diphtheria antitoxin increased the incidence of serum sickness by 50 per cent, while the anaphylaxis rate was 23 times greater than after the primary injections. Use of the intramuscular route increased the incidence of anaphylaxis 14 times, while use of the intravenous route increased it 62 times. Thermal reactions were decreased by 50 per cent through fractional dosage. There were, however, 6 deaths in this series directly due to them.

Kojis believes in the prophylactic value of routine administration of 5 minims (0.3 cc.) of a 1:1,000 solution of epinephrine to every patient before serum is given regardless of his state of sensitivity. The 5 deaths which occurred all followed secondary injections, 1 on the eighth day, 3 on the fifteenth day and 1 on the seventeenth day. These fatalities, each following a secondary injection, together with their symptoms and the typical postmortem observations in 2 cases identical with those of experimental animals, demonstrate, Kojis believes, that anaphylaxis does occur in man.

1. Kojis, F. G.: Serum Sickness and Anaphylaxis: Analysis of Cases of 6,211 Patients Treated with Horse Serum for Various Infections, Am. J. Dis. Child. **64**:91 (July), 313 (Aug.) 1942.

HEREDITARY ISOAGGLUTINOGENS

Ferguson and his co-workers[1] of the department of genetics, University of Wisconsin, have demonstrated at least thirty different hereditary isoagglutinogens in the red blood cells of cattle. This suggests chemical complexities in human erythrocytes beyond demonstration by current routine clinical technic. The use of natural isolysins and isoagglutinins for the demonstration of individual specificity differences in human and lower animal erythrocytes was first suggested by Landsteiner.[2] Fishbein[3] found that in man individuals could be separated into distinct groups depending on the presence or absence of one or more natural antigens in their corpuscles. In cattle, such natural isoagglutinogens also existed but appeared to be present in no special order, division into distinct blood groups being impossible. In order to account for this difference, Fishbein postulated the existence of "multitudinous

1. Ferguson, L. C.; Stormont, Clyde, and Irwin, M. R.: J. Immunol. **44**:147 (June) 1942.
2. Landsteiner, Karl, and Leiner, Karl: Centralbl. f. Bact. **38**:548, 1905. Landsteiner, Karl, and Reich, Max, ibid. **39**:712, 1905.
3. Fishbein, Morris: J. Infect. Dis. **12**:133, 1913.

agglutinins" in bovine serum or the existence of numerous modifying physical or chemical factors the existence or absence of which was independent of corpuscle specificity.

Using Levine's[4] improved centrifuge technic for hemagglutination, Little[5] was able to confirm this "multiplicity" but nevertheless was able to separate bovine erythrocytes into three overlapping groups, with numerous "anomalous reactions" or "aberrant types." In addition to the considerable overlapping between the major groups, classification was complicated by the frequent apparent coexistence of homologous agglutinin and agglutinogen in the same blood sample. Moreover, bovine agglutinins were modified in their titer by the presence or absence of serum complement.

Under the generous support of the cattle industry and of national and international research foundations, a detailed restudy of these multiple antigenic components in bovine erythrocytes was undertaken by the Wisconsin geneticists. The technic adopted by them was the use of immune isohemolysins, formed as a result of repeated citrated blood transfusions in pedigreed herds. By selecting closely related members of the same herd, such transfusions could be made with minimum toxic reactions. Numerous transfusions have thus been made of daughter blood into its own mother, with only an occasional retransfusion shock. Retransfusion with less closely related donor and recipient was frequently toxic, giving anaphylactic reactions characterized by muscular trembling, dyspnea, salivation, lacrimation and hemoglobinuria, with rectal temperature often rising to 104 F. Serum drawn from the recipient about ten days after the final retransfusion was occasionally of high hemolytic titer for donor erythrocytes if tested in the presence of rabbit complement.

The serum obtained by immunizing a cow against her own daughter's blood often contained but a single isohemolysin, a monovalent antibody incapable of fractionation by partial adsorption on related or nonrelated bovine erythrocytes. Occasionally a bivalent, trivalent or higher polyvalent isohemolysin was produced, which could be reduced to a monovalent lysin by fractional adsorption. Two years ago Ferguson[6] reported the preparation of the first seven monovalent isohemolysins by this technic, since which time the number has been increased to thirty. Each unit lysin presumably reacts with a single specific receptor in bovine erythrocytes.

By applying these thirty monovalent "reagents," analyses have been made of the erythrocytic complexity of numerous groups of pedigreed cattle. In one group of twenty-nine cows, for example, each specimen was found to contain from ten to fifteen recognizable erythrocytic unit antigens. No two animals yielded blood cells with the same combination of antigenic characters. Identical antigenic complexes, however, were subsequently obtained by erythrocytic analyses of identical twins. If these thirty cellular antigens represent the maximum number of hereditary specificities present in bovine erythrocytes, the calculated number of different individual combinations would be 2^{30}, or slightly over 1,000,000,000. "The addition of only a few more independently occurring antigens to the thirty now recognized would bring the calculated number of possible combinations to a staggering total, not even approached by the national debt." Antibodies against as many as twelve of these unit components (A, B, C, G, J, S, V, W, Y, Z, E' and G') have been identified in a single immune bovine serum. At least four of them (A, S, V and E) may coexist in certain natural serums or may be produced by injecting bovine erythrocytes into rabbits. In cattle, isoantigenicity seems to depend largely on variations in the capabilities of recipients to respond to alien chemical stimulants.

The Wisconsin geneticists were particularly interested in applications of their thirty unit characters to problems of inheritance. In one experiment 217 matings were made between parents both of which contained their arbitrary A character. Of the 240 offspring resulting from these matings 217 (90 per cent) had A antigen in their erythrocytes while 23 (10 per cent) were A negative. Assuming that character A is transmitted by a single hereditary gene and that in many of the matings both parents were heterozygous to the A character, these percentages would be in accord with mendelian expectations. In the same experiment 119 matings were made between parents only 1 of which was A positive. Of the 127 offspring resulting from such matings 76 (60 per cent) were A positive and 51 (40 per cent) A negative. This also is in accord with mendelian predictions. In control tests, 41 offspring born of parents both of which were A negative were all (100 per cent) A negative. Practically the same percentage distribution of hereditary unit characters was obtained with matings between cattle with or without each of the twenty-nine other cytologic isoagglutinogens. Without exception an antigen was not found in any calf from matings in which both parents lacked this character, a law which might have practical applications in cases of disputed parentage. The Wisconsin group was also interested in the fact that the number of hereditary antigens thus far demonstrated by them is the same as the number (thirty) of pairs of chromosomes generally accepted as present in bovine sex cells.[7]

The work of the Wisconsin geneticists is of suggestive clinical interest since it indicates the probable complexities of human erythrocytes that eventually may be demonstrated by improved laboratory technic.

4. Levine, P., and Mabee, J.: J. Immunol. 8:425 (Nov.) 1923.
5. Little, R. B.: J. Immunol. 17:377 (Nov.) 1929.
6. Ferguson, L. C.: J. Immunol. 40:213 (Feb.) 1941.
7. Krallinger, H. F.: Arch. Tierernahrung u. Tierzucht. 5:127, 1931.

Current Comment

FREQUENCY OF ABORTION AND ITS EFFECT ON MATERNAL MORTALITY

For obvious reasons, reliable national figures on the frequency of abortion or of deaths from abortion have not been available. All the studies on this subject have been limited in scope and generally confined to hospitals or clinics located in larger cities. Recently Dunn,[1] chief statistician for vital statistics of the Bureau of the Census, has reviewed the available information on the subject and subjected it to careful analysis. From this evidence he concludes that the number of deaths from abortion in the United States in 1940 may be estimated at between three and four thousand, which probably constitutes about 30 to 35 per cent of maternal deaths from all causes. Although the general rate for puerperal causes has been decreased, the death rate for abortion has probably not changed much. It is clear, therefore, that the role of abortion in maternal deaths is important and that its lowering would materially affect the number and percentage of maternal deaths from all causes.

1. Dunn, H. L.: Frequency of Abortion—Its Effect on Maternal Mortality Rates, Bureau of the Census Vital Statistics, Special Reports 15:431 (July 30) 1942.

ISOLATION OF A VIRUS OF EPIDEMIC KERATOCONJUNCTIVITIS

On February 7 The Journal commented editorially on the occurrence of epidemic virus conjunctivitis reported from Oahu, Hawaii.[1] Cultures and smears from conjunctival scrapings from some 50 cases failed to reveal any offending organism. A similar acute inflammatory disease of the eyes appeared somewhat later in epidemic form in the San Francisco shipyards, spread throughout the Pacific coast area and had reached the East Coast. According to Murray Sanders[2] the disease as seen in New York appears as an acute follicular conjunctivitis with enlarged and sometimes painful preauricular lymph nodes. In severe involvement the conjunctiva is extremely congested and chemotic, and transient pseudomembranes may appear. Symptoms appear four to five days after exposure. The results of bacteriologic studies of conjunctival scrapings have been essentially negative. Experimental studies reported by Sanders suggest that a possible specific agent of the nature of a virus has been isolated. The pathologic picture produced in mice by intracerebral inoculation of conjunctival scrapings of a patient suffering with this disease, while not unique, did not resemble that in other common virus infections. The infectious agent was maintained when brain emulsion from the second mouse passage was put into tissue culture. Serial subcultivation was possible only at room temperature and by the use of ground up tissue culture as inoculum. A human volunteer who received the mouse virus in his conjunctiva responded in four days with a mild conjunctivitis. When mouse virus was again applied to the same eye there was observed four days later a typical picture of epidemic keratoconjunctivitis. Definite neutralization of the agent was obtained when it was mixed with serum of a patient who supplied the original material. The neutralizing power of the serum varied from 100 to 10,000 mouse doses. The serum of another patient, also recovered from epidemic keratoconjunctivitis, contained definite neutralizing antibodies. However, a third patient who had recovered from epidemic keratoconjunctivitis failed to show neutralizing antibodies. Sanders states that a second isolation of virus has been effected and that thorough investigation of the two strains is now under way. It is to be hoped that the investigation of these two strains will throw additional light on the specificity of the offending agent.

1. Epidemic Virus Conjunctivitis, editorial, J. A. M. A. 118:460 (Feb. 7) 1942.
2. Sanders, Murray: Epidemic Keratoconjunctivitis ("Shipyard Conjunctivitis"): I. Isolation of a Virus, Arch. Ophth. 28:381 (Oct.) 1942.

HOSPITAL STANDARDS FOR CARE OF CRIPPLED CHILDREN

Hospital care is being provided for crippled children under approved state plans in more than seven hundred state hospitals. During the calendar year ended Dec. 31, 1941 nearly a million and a half days of care were provided in these hospitals for more than 31,000 crippled children. In a discussion of the hospital standards in these institutions, Van Horn and Lesser[1] emphasize that it is reasonable to expect that a public agency charged with the responsibility for spending public tax funds for the purchase of hospital care should purchase such care only from hospitals meeting standards which are acceptable to the agency. Minimum standards for hospital care of crippled children adopted in 1936 under the Social Security Act provided, in essence, that hospitals should have a qualified physician certified by the American Board of Orthopedic Surgery on their staff, at least one qualified physical therapist on the staff, and one qualified nurse with experience in pediatric and orthopedic nursing. They should conform with the minimum standards established by the American College of Surgeons, should employ at least one qualified medical social worker and should have physical therapy equipment including a room equipped with at least an exercise table and some form of radiant heat. Additional standards have been added since, including registration by the American Medical Association, provision of adequate facilities for the protection and isolation of children suffering from communicable diseases, inspection for fire hazards and adequate fire protection, and facilities for pediatric and other specialty consultation and supervision. A number of state agencies have recognized the needs for certain additional requirements. As pointed out by these physicians of the United States Children's Bureau, there has been unquestionably gradual but steady improvement in hospital standards for crippled children. Nevertheless there is need for continued efforts on the part of both public agencies and hospital authorities to bring about further progress in this direction. Likewise, they say, there is urgent need in all sections of the country for a better understanding between public agencies and hospital authorities of their mutual interests and of their responsibilities to the state and community which they serve.

1. Van Horn, A. L., and Lesser, A. J.: Hospital Standards for the Care of Crippled Children, Child 6:300 (June) 1942.

MEDICINE AND THE WAR

In this section of The Journal each week will appear official notices by the Committee on War Participation of the American Medical Association, announcements by the Surgeon Generals of the Army, Navy and Public Health Service, and other governmental agencies dealing with medicine and the war and such other information and announcements as will be useful to the medical profession.

SOLDIERS' AND SAILORS' CIVIL RELIEF ACT AMENDMENTS

PREPARED BY THE BUREAU OF LEGAL MEDICINE AND LEGISLATION

The Soldiers' and Sailors' Civil Relief Act was approved on Oct. 17, 1940. Its purpose, as indicated in an analysis of it that was published in THE JOURNAL, Jan. 24, 1942, page 306, was to free persons in military service from harassment and injury to their civil rights during their term of military service and thus to enable them to devote their entire energy to the national defense. Experience under the act, however, has disclosed many defects and shortcomings, and numerous bills have been introduced in the Congress dealing with specific problems that have arisen. A subcommittee of the House Committee on Military Affairs was appointed to study the various proposals and as a result of that study legislation was drafted, H. R. 7164, to extend the relief and benefits provided under the original act. This bill has now passed the House and Senate and was approved by the President on October 6.

IN GENERAL

The new law extends benefits to transactions that have occurred since Oct. 17, 1940. It extends benefits to persons who serve with the forces of any nation with which the United States may be allied in the prosecution of the war and who immediately prior to such service were citizens of the United States. Persons who have been ordered to report for induction under the Selective Training and Service Act will be entitled to benefits during the period beginning on the date of receipt of such an order and ending on the date on which such person reports for induction. Any member of the Enlisted Reserve Corps who is ordered to report for military service will be entitled to benefits during the period beginning on the date of receipt of such order and ending on the date on which he reports for such service. The Secretary of War and the Secretary of the Navy are required to make provision in such manner as each may deem appropriate for his respective department, to insure the giving of notice of the benefits accorded by the act to persons in and to persons entering military service.

LEASES

Of particular interest to physicians is the new provision relating to leases. Under the original act no provision was made for the cancellation of leases, nor did the section relating to leases apply to leases on property used for office purposes. The new law applies to any lease covering premises occupied for dwelling, professional, business, agricultural or similar purposes in any case in which (*a*) such lease was executed by or on the behalf of a person who, after the execution of such lease, enters military service and (*b*) the premises so leased have been occupied for such purpose or for a combination of such purposes by such person or by him and his dependents.

Any such lease may be terminated by notice in writing delivered to the lessor (or his grantee) or to the lessor's (or his grantee's) agent by the lessee at any time following the date of the beginning of his period of military service. Delivery of such notice may be accomplished by placing it in an envelope properly stamped and duly addressed to the lessor (or his grantee) or to the lessor's (or his grantee's) agent and depositing the notice in the mails. Termination of any such lease providing for monthly payment of rent will not be effective until thirty days after the first date on which the next rental payment is due and payable subsequent to the date when such notice is delivered or mailed. In the case of all other leases, termination will be effected on the last day of the month following the month in which the notice is delivered or mailed, and in such case any unpaid rental for a period preceding termination shall be proratably computed and any rental paid in advance for a period succeeding termination must be refunded by the lessor (or his assignee).

On application by the lessor to an appropriate court prior to the termination period provided for in the notice, any relief granted by the act will be subject to such modifications or restrictions as, in the opinion of the court, justice and equity may in the circumstances require.

Any person who knowingly seizes, holds or detains the personal effects, clothing, furniture or other property of any person who has lawfully terminated a lease covered by the act or in any manner interferes with the removal of such property from the premises covered by the lease, for the purpose of subjecting or attempting to subject any of the property to a claim for rent accruing subsequent to the date of termination of the lease, or attempts so to do, will be guilty of a misdemeanor and punishable by imprisonment not to exceed one year or by fine not to exceed $1,000 or both.

STORAGE LIENS

A new section clarifies the original act in connection with the protection of persons coming into service from foreclosure of storage liens on household goods stored for the period of military service. No person may exercise any right to foreclose or enforce any lien for storage of household goods, furniture or personal effects of a person in military service during such person's period of service and for three months thereafter except on an order previously granted by a court. In such a proceeding the court may, unless in the opinion of the court the ability of the defendant to pay the storage charges due is not materially affected by reason of his military service, (*a*) stay the proceedings or (*b*) make such other disposition of the case as may be equitable to conserve the interest of all parties.

BENEFITS ACCORDED DEPENDENTS

The dependents of a person in military service will be entitled, on application to a court therefor, to the benefits accorded to persons in military service in connection with rents, instalment contracts, mortgages, liens, assignments and leases, unless in the opinion of the court the ability of such dependents to comply with the terms thereof has not been materially impaired by reason of the military service of the person on whom the applicants are dependent.

INSURANCE PREMIUMS

The benefits of the act in connection with insurance premiums are extended to policies up to $10,000 face value. In order to obtain the benefits, the insured must make written application to the Administrator of Veterans' Affairs. If the insured is outside the continental United States, excluding Alaska and the Panama Canal Zone, the beneficiary may apply for the benefits. The term "policy" is defined to include any contract of life insurance or policy on a life, endowment or term plan, including any benefits in the nature of life insurance arising out of membership in any fraternal or beneficial association. The policy must not provide for the payment of any sum less than the face value thereof or for the payment of an additional amount as premiums if the insured engages in military service. It must not contain any limitation or restriction on coverage relating to engagement in or pursuit of certain types of activities which a person might be required to engage in by virtue of his being in military service. The policy must (1) have been in force on a premium-paying basis at the time of application for benefits and (2) must have been made and a premium paid thereon before Oct. 6, 1942 and not less than thirty days before the date the insured entered into military service. The benefits are not applicable to policies or contracts issued under the War Risk Insurance Act, the World War Veterans Act or the National Service Life Insurance Act of 1940.

The Veterans' Administration is required to give notice to the military and naval authorities of the provisions of the act and must include in such notice an explanation of the provisions for the information of those desiring to make application for the benefits. An insured will have two years after the period of military service to repay premiums guaranteed by the government under the act. Interest on such premiums will be payable at the same interest rate as fixed in the policy for policy loans.

MISCELLANEOUS BENEFITS

The section of the original act which authorized in certain circumstances the repossession of automobiles of persons in military service is repealed. A new section prohibits interest at a rate in excess of 6 per cent on obligations of persons in military service incurred prior to his entry therein. A court may grant certain relief with respect to mortgages and taxes on property owned by persons not in military service when the rent for such property is not paid by dependents of persons in military service. The protection provided by the original act in respect of taxes on real property is extended to include taxes (other than income taxes) on personal property. The requirement that such taxes must have fallen due during the period of military service has been eliminated, as has also been the requirement that the person in military service must file an affidavit with the tax collector in order to prevent sale for delinquency without court action. A new section grants to persons in military service relief for a specified period after military service in order to enable them to liquidate their liabilities in an orderly fashion and not be subject to the accrual and payment of these liabilities all at one time. The court may grant an order staying enforcement of obligations either for a period of time equal to the period of military service or, in the case of certain real estate mortgages and contracts, for a period of time equal to the remaining life of the contract plus the period of military service.

ARMY

MEDICAL DETACHMENT COLLECTS SEVENTY TONS OF SCRAP METAL

The salvage officer at the Medical Field Service School, Carlisle Barracks, Pa., has collected and turned in during the present scrap drive more than 70 tons of scrap metal. The scrap obtained includes two German field pieces turned over by the Carson Long Institute, New Bloomfield, four small cannon formerly on the quadrangle at Carlisle Barracks, 20 pounds of razor blades, 51 pounds of tooth paste tubes, 6,660 pounds of tin cans, 1,245 pounds of copper, 2,002 pounds of brass, 950 pounds of aluminum, 162 pounds of lead and 134,760 pounds of iron and steel, according to a report made by Brig. Gen. Addison D. Davis, in command of the Medical Field Service School.

MEDICAL OFFICERS FOR NEW INFANTRY DIVISIONS

Twenty-eight U. S. Army medical officers completed a special training course at the Medical Field Service School, Carlisle Barracks, Pa., September 4, and, after brief graduation exercises, left for their posts in medical battalions of new infantry divisions which are being activated. This class was under training at the same time that classes were being conducted at various other army service schools to train officers of other branches similarly. According to a news release from the Medical Field Service School, this course provided individual instruction so that each officer was trained specifically for the particular duty he will perform. Another class of medical officers arrived at Carlisle Barracks on September 7 to begin another special training course of instruction. Following are the names and the home towns of the officers who graduated on September 4:

Beckwith, Harry S., Capt., Winslow, Ariz.
Blair, Clifford J., Capt., Oklahoma City.
Bolton, Eldon L., Major, Biloxi, Miss.
Bourne, John R., Capt., Salt Lake City.
Burstein, Henry A., Capt., Cleveland.
Dietrich, Hervey W., Capt., Madison, Wis.
Dougherty, Cary M., Capt., Jackson, La.
Hebert, Thomas F., Capt., Covington, La.
Howard, Glenn T., Capt., Bruni, Texas.
Johns, Sydney L., Capt., Crafton, Pa.
Kilgore, Byron, Jr., 1st Lieut., Danville, Ind.
Kistler, James J., Capt., LaPorte, Ind.
Locklin, Walter K., Capt., Hartford, Mich.
Maril, William D., Capt., Oklahoma City.
Matts, Robert M., Capt., Yuma, Ariz.
McArthur, Charles E., Major, Cordele, Ga.
Merrynne, Robert D., Capt., Pasadena, Calif.
Montgomery, Samuel A., Capt., Des Moines, Iowa.
Mouw, Dick, R., 1st Lieut., Grandville, Mich.
Owen, Duncan S., 1st Lieut., Fayetteville, N. C.
Powell, Eppie C., Major, Goldsboro, N. C.
Price, Douglas W. Capt., Napanee, Ind.
Rack, Morris A., 1st Lieut., McKeesport, Pa.
Sach-Kowitz, Alvan, Major, Moose Lake, Minn.
Shapiro, Isadore A., Capt., Toledo, Ohio.
Smollar, Leo, Capt., Chicago.
Stern, Louis S., Capt., West Allis, Wis.
Stiles, Wendel A., Major, Dallas, Texas.

EIGHT HUNDRED OFFICERS GRADUATE AT CARLISLE BARRACKS

The Medical Field Service School at Carlisle Barracks, Pa., graduated a class of 571 officers in the medical department, September 29, after completion of a special course to qualify them for duty with troops in the field. Among the students were three colonels, two lieutenant colonels, twenty majors, 129 captains and 352 first lieutenants, all of the medical corps, in addition to officers of the dental, veterinary, sanitary and medical administrative corps. The course included training in map reading, sanitation, logistics, administration and military art. The graduation ceremonies were attended by hundreds of relatives and friends of the members of the class. The commandant, Brig. Gen. Addison D. Davis, delivered an address stressing the importance of these studies, and Col. Albert S. Dabney, medical corps, assistant commandant of the school, sketched the history of the school and of Carlisle Barracks.

On September 26 the Medical Field Service School graduated 241 new officers as second lieutenants in the medical administrative corps. These officers will take over administrative duties in medical units and thus enable the army to release medical officers for more strictly professional duties. The Rt. Rev. Oliver James Hart, a chaplain in the first world war and also a chaplain in the present war until honorably discharged to accept the appointment of Bishop Coadjutor of Pennsylvania, delivered the graduation address in the presence of many relatives and friends of the new officers. Bishop Hart is an uncle of Second Lieut. Joseph E. Hart of York, S. C., a member of the class, and a brother of Col. William Lee Hart, M. C., senior medical officer of the eighth service command. The oath of office was administered by Lieut. Col. Thomas G. Hester, adjutant of the Army Medical Center, Washington, D. C. Members of this class who had completed several months of special training were selected from the enlisted ranks for their outstanding performance of duty and ability. Major Gen. James C. Magee, Surgeon General of the Army, Washington, D. C., sent a special message of congratulation to the new officers on completion of the course.

ARMY TO TRAIN PSYCHOLOGISTS TO SIFT ILLITERATE SELECTEES

A training course for civilian psychologists who are to test illiterate Selective Service men will be instituted soon under direction of the adjutant general at Fort Leavenworth, Kansas, the War Department announced, September 24. Those successfully completing the course will serve in the army specialist corps, in which some of the prospective students already have been commissioned. The demand for psychologists is a result of a recently adopted army policy of taking illiterate persons into service when it is felt that the degree of illiteracy is no bar to successful completion of military training. The course offered at Fort Leavenworth in October will be attended by more than a hundred and fifty psychologists, who will receive general indoctrination in army methods and specific instruction in the examining devices used at induction stations. The psychologists will be assigned to induction stations throughout the country. To determine whether a selectee is acceptable, a three part screening process will be used. First an oral interview will be given in which men are passed immediately on the basis of their obvious qualifications or held for further examination. If the man fails to pass the initial interview, he receives a nonlanguage, visual classification, test which is conducted as far as possible in pantomime in order that the test may be fair to men who may be literate in their own language but unable to speak or write English. If on the basis of the first two tests the examining psychologist finds that the registrant is of marginal ability, at his option he may give a third screening, designed to determine whether the selectee can follow oral orders, all simple, but of varying nature. Illiterates who prove acceptable for service will be assigned to units for which their occupational experience best fits them and will have an opportunity to attend night schools or such other extracurricular classes as may be practicable.

MAJOR GENERAL OF BRITISH ARMY VISITS CARLISLE BARRACKS

Major Gen. Alexander Gordon Biggam of the British Army Medical Service visited Carlisle Barracks, October 1, and was guest of honor at the weekly ceremonial parade. Also in the reviewing party were Major Gen. Charles R. Reynolds, United States Army, retired, former Surgeon General of the Army and commandant of the Medical Field Service School from 1923 to 1931, and Col. Frank S. Gillespie.

General Biggam was recently director of medical services in Burma, formerly was director of a medical unit at Kasr-el-Aini Hospital, Cairo, and was professor of clinical medicine at a university in Egypt, examiner in medicine at the Kitchener School of Medicine, Khartoum, and at the American University of Beirut.

Colonel Gillespie, British army medical service liaison officer at the school, met General Biggam in Washington and accompanied him to Carlisle. Entering the Royal Army Medical Corps in 1912, General Biggam saw action in four major battles in France. He was named a king's honorary physician in 1937. He is an officer of the Order of the British Empire and a fellow of the Royal College of Physicians of London, also a commander of the Egyptian Order of the Nile.

GRADUATION OF OFFICERS AT CHEMICAL WARFARE SCHOOL

Ninety-nine medical officers were addressed by Major Gen. James C. Magee, the Surgeon General, at the graduation ceremonies of the first medical officers course, Chemical Warfare School, Edgewood Arsenal, Maryland, October 2. Under the direction of Brig. Gen. Ray L. Avery and Col. Milton T. Hankins, commandant and assistant commandant of the school, and Capt. Aubrey L. Sparks, course director, the officers were instructed in basic chemical warfare agents, protection against toxic agents, diagnosis, pathology and treatment. The graduating officers, members of the medical corps, who ranged in rank from first lieutenants to majors, returned to their stations throughout the country to act as instructors to other medical officers. The course of study was the first of its kind to be given, and its success has paved the way for additional classes to start immediately.

FATHER AND THREE SONS IN SERVICE

Dr. John C. Hubbard and his three sons, all formerly on the staff of the Hubbard Hospital-Clinic, Oklahoma City, have been commissioned in the medical department of the U. S. Army. The father, Major John C. Hubbard, is now at the station hospital, Fort Sill, Okla., a son, Major Ralph W. Hubbard, was taken prisoner by the Japanese in the Philippine Islands, Major John R. Hubbard is chairman of the medical examining board and on the board of induction at Oklahoma City, while the other son, First Lieut. William E. Hubbard, is at the School of Aviation Medicine, Randolph Field, Texas.

AVIATION PHYSIOLOGISTS

A course of instruction to qualify air corps personnel for duty as aviation physiologists began at the School of Aviation Medicine, Randolph Field, Texas, September 28. Following is a list of the students enrolled:

1st Lieut. Bentley R. Baker, Medical Corps.
2d Lieut. Clarence A. Maashe, Air Corps.
1st Lieut. Victor J. Monke, Air Corps.
2d Lieut. Ferrin B. Moreland, Air Corps.
1st Lieut. George J. Pastorius, Medical Corps.
1st Lieut. Nathan Rakieten, Air Corps.
1st Lieut. Clark K. Sleeth, Medical Corps.
2d Lieut. Ralph I. Smith, Air Corps.
1st Lieut. Louis A. Toth, Air Corps.
T/4th Gr. Leonard Grumbach, Medical Department.
Pvt. Clarence W. McNutt, Medical Department.

SENIOR MEDICAL OFFICER IN ENGLAND

In the list of nominations confirmed by the United States Senate late in September was that of Col. Paul R. Hawley, M. C., U. S. Army, senior medical officer in England, to be a brigadier general.

EMORY UNIVERSITY HOSPITAL UNIT ACTIVATED

The Emory University Hospital Unit, U. S. Army General Hospital No. 43, was activated on the first of September. The unit was organized more than a year ago and some of its officers had already gone on active duty. During the first world war the Emory University Hospital Unit, designated Base Hospital No. 43, served in France at Blois about 75 miles southwest of Paris, where about 10,000 patients were treated before the unit was ordered home in 1919. In the new unit Dr. Ira Ferguson and Dr. Hugh Wood will be chief of the surgical and medical services, respectively, with the rank of lieutenant colonel. While Dr. Ferguson has been the acting unit director, a regular army medical corps officer is to be assigned as the commanding officer of the unit.

The other physicians on the staff of General Hospital No. 43, most of whom are from Georgia, are, according to the Fulton County Medical Society Bulletin, as follows:

Bailey, Major Milus K., Atlanta
Blackford, Major Launcelot M., Atlanta
Boling, Major Edgar, Atlanta
Bryan, Major William W., Atlanta
Burke, Major Benjamin R., Atlanta
Claiborne, Major Thomas S., Atlanta
Cross, Major John B., Atlanta
Hanner, Major James P., Atlanta
Harpole, Major (D. C.) Homer J., Atlanta
Joiner, Major Hartwell, Gainesville
Linch, Major Albert O., Atlanta
Martin, Major John D., Jr., Atlanta
Monfort, Major John M., Atlanta
Parker, Major Francis P., Atlanta
Strickler, Major Cyrus W., Jr., Atlanta
Trimble, Major William H., Atlanta
Agnor, Capt. Elbert B., Atlanta
Armstrong, Capt. William B., Atlanta
Boland, Capt. Frank K., Jr., Atlanta
Boland, Capt. Joseph H., Atlanta
Bosworth, Capt. Edward L., Fort Story, Va.
Chambers, Capt. James W., LaGrange
Ferguson, Capt. Anderson D., Atlanta
Funkhouser, Capt. (D. C.) W. L., Atlanta
Gibson, Capt. Roy C., Columbus
Gillespie, Capt. Robert H., Atlanta
Hauck, Capt. Allen E., Atlanta
Hoffman, Capt. Byron J., Atlanta
Hughes, Capt. (D. C.) Julius C., Atlanta
Lange, Capt. John H., Atlanta
Mabon, Capt. Robert F., Atlanta
Myers, Capt. Guy A., Atlanta
Stone, Capt. Charles F., Jr., Atlanta
Weinberg, Capt. James I., Atlanta
Wole, Capt. Bernard, Atlanta
Croswell, 1st Lieut. (D. C.) Harry A., Atlanta
Everett, 1st Lieut. (D. C.) Sephus M., Atlanta
Gibboney, 1st Lieut. Harry S., Camp Croft, S. C.
Goodyear, 1st Lieut. William E., Emory University
Rasmussen, 1st Lieut. Earl, Fort McPherson
Smith, 1st Lieut. Fredrich A., Jr., Atlanta
Varner, 1st Lieut. William D.
Wheeler, Capt. Nicholas A., LaFayette, Ala.
White, 1st Lieut. Cecil G., Jr., Carnegie, Pa.

ILLINOIS HOSPITAL UNIT TO GO ON ACTIVE DUTY

The University of Illinois Hospital Unit, the twenty-seventh evacuation hospital, will go on active duty in October. Dr. Charles B. Puestow, associate professor of surgery at the University of Illinois College of Medicine, Chicago, and now commissioned lieutenant colonel, for some weeks has been at the Walter Reed General Hospital in Washington for a period of training. Lieutenant Colonel Puestow, who organized the unit, will be director of this 750 bed mobile hospital. The other medical members of the personnel are largely University of Illinois alumni. At a party in honor of the unit at the Illini Union Building on the Chicago Campus, September 22, the speakers were Governor Green, Mayor Kelly of Chicago, President Willard and the board of trustees of the University of Illinois, Admiral John Downes, commandant of the ninth naval district, Major Gen. H. S. Aurand, commanding general of the sixth service command, Col. Chester L. Fordney of the U. S. Marines, Col. J. E. Bastian, surgeon of the sixth service command and other officers. Dr. George W. Post Sr., president of the medical alumni of the university, was on the executive committee in charge of the arrangements. Following is a list of the personnel of the twenty-seventh evacuation hospital unit:

Lieut. Charles Allison, Kankakee, Ill.
Capt. Robert E. Bedard, Kankakee, Ill.
Capt. Robert P. Blatchley, D. C., Cook County Hospital.
Capt. Daniel E. Bowers, Peoria, Ill.
Capt. Lawrence Brenlow, Chicago.
Lieut. John J. Brosnan, Chicago.
Lieut. Joseph H. Buckley, Chicago.
Capt. George V. Byfield, Chicago.
Capt. Clifford L. Carter, Ottawa, Ill.
Lieut. James H. Cross, Chicago.
Dr. Roland Cross Jr., New York (formerly of Chicago).
Dr. Howard I. Down, Sioux City, Iowa.
Capt. Arthur H. Eriesen, M. A. C., Chicago.
Dr. Edward G. Evans, Aurora, Ill.
Lieut. Charles E. Fildes, Chicago.
Major William J. Gillesby, Effingham, Ill.
Lieut. Glen Goodwine, M. A. C., Chicago.
Lieut. Harold A. Grimm, Chicago.
Capt. John O. Hanson, Chicago.
Lieut. Noel J. Hershey, Niles, Mich.
Capt. Herman Joffe, Chicago.
Dr. Robert M. Jones, Chicago.
Lieut. Karlton H. Kemp, Texarkana, Texas.
Capt. John P. Klein, Reed City, Mich.
Capt. William P. Kleitsch, Chicago.
Lieut. Sidney Lane, Berrien Center, Mich.
Capt. James W. Lewis, Evanston, Ill.
Capt. Edward S. Lundgren, Chicago.
Capt. John H. Mathis, Atlantic City, N. J.
Major Oscar E. Nadeau, Chicago.
Capt. Edward L. Schrey, Chicago.
Major Archibald Spelman, Smithville, Mo.
Capt. Thomas A. Weaver Jr., Cincinnati.
Lieut. Edward F. Webb, Chicago.
Lieut. John C. Whittier, New York.

CIVILIAN DEFENSE

EMERGENCY BASE HOSPITALS

The Medical Division of the U. S. Office of Civilian Defense, through its regional medical officers and state chiefs of Emergency Medical Service, has now made emergency provision for the establishment of a chain of emergency base hospitals in the interior of all the coastal states. They will be activated only in the event of an enemy attack on our coast which necessitates the evacuation of coastal hospitals. Each base hospital will be related to the casualty receiving hospital which has been evacuated and it is expected that the staff will be recruited largely from the parent institution.

In order to meet a sudden and unexpected crisis without delay, arrangements have been completed with state authorities for the prompt taking over of appropriate institutions in the interior of the state for this purpose and with local military establishments for the transportation of casualties and other hospitalized persons along appropriate lines of evacuation.

More than a hundred and fifty hospitals in the coastal cities are in the process of organizing small affiliated units of physicians and surgeons, which will be prepared to staff the emergency base hospitals if they should be needed. These units are composed of the older members of the staff and those with physical disabilities which render them ineligible for military service, and of women physicians. In order that a balanced professional team may be immediately available, the doctors comprising units are being commissioned in the inactive reserve of the U. S. Public Health Service so that, if called to duty, they may receive the rank, pay and allowances equivalent to that of an officer in the armed forces.

Dr. George Baehr, chief medical officer of the U. S. Office of Civilian Defense, states that the members of these affiliated hospital units will continue to remain on an inactive status for the duration of the war unless a serious enemy attack occurs in their region which necessitates the transfer of casualties to protected sites in the interior. Their commissions may be terminated on their request six months after the end of the war, or sooner if approved by the Surgeon General. Such approval will be given in the event such officer desires active duty in the Army or Navy.

EMERGENCY MORTUARY SERVICES

The Medical Division of the United States Office of Civilian Defense has just issued Bulletin No. 5 on Emergency Mortuary Services. The medical aspects of this bulletin are herewith condensed for the benefit of readers of THE JOURNAL.

In some air raids 40 per cent of the casualties may be fatal. Although the wounded require first attention, the dead should also be cared for promptly and inconspicuously. To facilitate identification, each civilian in target areas of the country should be encouraged to carry an identification bracelet or necklace or metal identification pocket piece.

The necessary organization to clarify the lines of responsibility for handling the fatalities should be created by a conference called by the local chief of the emergency medical

service. The conferees should include the local medical examiner, coroner or similar official, the chief of police, the health officer and a representative of the private funeral directors and cemeteries. In large cities the morgue facilities and equipment should not be concentrated in one place. The main morgue should be centrally located, but tentative arrangements should be made for the use of skating rinks, gymnasiums, auditoriums or similar buildings for use as supplementary morgues, as necessary, to provide for total space to lay out bodies in the ratio of two per thousand of population in target areas. The normal morgue personnel should be supplemented by auxiliaries who have been trained by instructors. The staff of the emergency mortuary service should include a physician to confirm deaths and a coroner or other medical examiner's representative who has authority to sign death certificates and order disposal of unidentified bodies. Volunteer members of an emergency mortuary organization are to enroll with the Volunteer Civilian Defense Office and are entitled to wear the armband and insignia of the Emergency Medical Service, of which the Mortuary Service is a part.

Whenever possible a physician should examine the body before it is moved to the morgue so as to determine whether life is actually extinct. A physician should be charged with this duty, since to the inexperienced a condition of profound shock with extremely shallow respiration may give the appearance of death. Immediately after arrival at the morgue a physician should again examine each body to confirm the state of death; if there is any possibility of life, the body should be removed at once to a hospital. Unidentified bodies should be kept in a room separate from those already identified, so that a minimum number of bodies will be seen by persons viewing the bodies for purposes of identification. Identified bodies should be released to private funeral directors as soon as they are claimed by responsible relatives.

The director of the Emergency Mortuary Service should call on the senior gas officer of the local Civilian Defense Office for technical advice and assistance in setting up procedures for handling bodies contaminated or suspected of contamination with persistent gases. It is important that the identification tag on such bodies be distinctly marked "gas case" in order that persons handling them will be warned to give them special treatment. Such bodies should be collected and moved only by workers wearing protective clothing and masks. All clothing and effects should be taken from the body, decontaminated and taken to the morgue. The body should be cleansed by approved methods before being admitted to the morgue. Persons who have performed these procedures must themselves subsequently go through the cleansing prescribed for decontamination squad members.

Other matters discussed in this bulletin include nonmedical personnel needed, such as recorders, morgue attendants and clerical assistance, transportation facilities, disposal of personal property, morgue storage, identification procedures, release and disposal of bodies (including emergency mass disposal of bodies) and completion and storage of records.

DR. BAEHR VISITS ENGLAND

Dr. George Baehr, chief medical officer, Office of Civilian Defense, Washington, D. C., has gone to England to study Britain's emergency medical service and to confer with medical leaders. Dr. Baehr will be abroad for several weeks.

WAR PRODUCTION BOARD

ALLOCATION OF NARCOTIC DRUGS

Under a directive issued by the chairman of the War Production Board, October 6, the U. S. Bureau of Narcotics is authorized to allocate narcotic drugs in such manner and to such extent as it may deem necessary or appropriate in the public interest and to promote the national defense.[1] The bureau may regulate or prohibit the production, manufacture, sale, transfer or other disposition of narcotic drugs by any person who has acted in violation of any regulation or order prescribed by it pursuant to the directive and may require such reports and the keeping of such records and may make such investigations as it deems necessary or appropriate. The chairman of the War Production Board may from time to time delegate to the bureau such additional powers with respect to the exercise of control over narcotic drugs or may amend or revoke the delegation contained in the directive in such manner and to such extent as he may determine to be necessary or appropriate. No preference rating heretofore or hereafter assigned, applied or extended will have any binding effect with respect to any transaction in narcotic drugs unless the Bureau of Narcotics expressly so orders. For the purpose of the directive, the term "narcotic drugs" is defined to mean opium, coca leaves, cocaine or any salt, derivative or preparation of opium, coca leaves or cocaine.

1. Federal Register, Oct. 7, 1942, p. 7938.

MISCELLANEOUS

DENTISTS IN TRAINING TO AID PHYSICIANS

Sixteen dentists in Flint, Mich., are taking special training in Flint hospitals at the invitation of the Genesee County Medical Society to enable them to assist physicians by performing certain medical procedures and thus to relieve the shortage of physicians created by the demands of military service. The training will qualify the dentists in obtaining blood for examinations, intravenous feeding, intramuscular injections, intravenous injections and obtaining blood from donors for blood banks. Several of the number are already qualified in some of these fields and are assisting in clinics and with Selective Service examining boards.

Colorado dentists are engaged in a similar program under the auspices of the Colorado State Dental Association and the Committee on Emergency Medical Service of the State Defense Council. The plan was initiated by the presidents of the State Dental Association and of the Denver Dental Association, in cooperation with the board of trustees of the Colorado State Medical Society. Facilities of the University of Colorado School of Medicine and the Colorado General Hospital have been made available for the instruction. A class of seventy dentists has finished a course of lectures on anesthesia, and small groups are now assigned to the hospital for practical training. It is planned that the dentists shall return to the hospital at intervals for review after their training is completed. Preliminary lectures on shock and treatment of open wounds have also been presented.

Classes are being organized in maxillofacial surgery, oral surgery, serology, taking of blood for transfusion, and in the treatment of shock, hemorrhage and open wounds.

Dr. Ralph Christy, president of the state dental association, in a report to the Dental Preparedness Committee of the American Dental Association, emphasized the desire of dentists to assist the medical profession in an emergency, the willingness of physicians to give the necessary instruction and the importance of practical training in hospitals in addition to didactic lectures.

The Medical Division of the Office of Civilian Defense in April issued a statement recommending that dentists qualify themselves in first aid in order that they may act as instructors and as members of emergency medical field units in casualty stations and first aid posts in the event of air raids, in the administration of anesthesia, and in the care of injuries of the face and jaws.

ORGANIZATION SECTION

OFFICIAL NOTES

GRANTS AVAILABLE FOR RESEARCH

The Committee on Scientific Research of the American Medical Association invites applications for grants of money to aid in research on problems bearing more or less directly on clinical medicine. Preference is given to requests for moderate amounts to meet specific needs. Application forms may be obtained from the Committee on Scientific Research at 535 North Dearborn Street, Chicago.

MEDICAL LEGISLATION

DISTRICT OF COLUMBIA

Change in Status.—S. 2804, proposing to define the real property exempt from taxation in the District of Columbia, has been recommitted to the Senate Committee on the District of Columbia and has been rereported by that committee, with additional amendments. As rereported, the bill specifically exempts from taxation buildings belonging to and used in carrying on the purposes and activities of the Medical Society of the District of Columbia.

MEDICAL BILLS IN CONGRESS

Changes in Status.—H. R. 7378, the Revenue Act of 1942, has passed the House and Senate. As passed by the Senate the bill retains the House provision providing relief to the estate of a taxpayer in connection with the uncollected accounts on the books of the taxpayer at the time of death. A Senate amendment, if concurred in by the House, will permit the deduction of expenses incurred for medical care when in excess of 5 per cent of the taxpayer's income. The maximum deduction may not exceed $2,500 in the case of the head of a family and not in excess of $1,250 in case of all other individuals. H. R. 7164 has been signed by the President, amending the Soldiers' and Sailors' Civil Relief Act. Elsewhere in this issue appears an analysis of this new law. Of particular interest to physicians is the section authorizing the cancellation of leases on premises occupied for professional purposes. S. 2248 has passed the House and Senate, providing for the care and custody of insane residents of Alaska. S. 2676 has passed the House and Senate, providing for medical care and funeral expenses for certain members of the Naval Reserve Officers' Training Corps. H. R. 6839 has been reported to the House, providing for the appointment in the Naval and Marine Corps Reserve of persons with physical disabilities. H. R. 7311 has passed the House, proposing to grant domiciliary care and medical and hospital treatment to veterans of World War II on a parity with veterans of other wars. The House Committee on Ways and Means has ordered reported H. R. 7568, relating to the manufacture and distribution of narcotic drugs. H. R. 7661 has been reported to the House, providing for the rehabilitation of disabled veterans of the present war.

Bills Introduced.—S. 2820, introduced by Senator Johnson, Colorado, H. R. 7633, introduced by Representative Edmiston, West Virginia, and H. R. 7678, introduced by Representative Jonkman, Michigan, propose to increase the pay and allowances of members of the Army Nurse Corps. S. 2827, introduced by Senator Walsh, Massachusetts, for himself and Senator Clark, Missouri, proposes to provide for the rehabilitation of disabled veterans of the present war. S. 2832 and S. 2833, introduced by Senator Clark, Missouri, propose to extend the provisions of existing law according hospital and medical care to veterans to any officer, enlisted man, member of the Army Nurse Corps (female) or Navy Nurse Corps (female) employed in the active military or naval service of the United States on or after Dec. 7, 1941 and before the termination of the present war. The latter bill provides that in granting hospital treatment and domiciliary care where such treatment or care is for disabilities not shown to be due to military or naval service the Administrator of Veterans' Affairs is authorized and directed to give preference to veterans who have been discharged by reason of disability and to veterans entitled to or receiving compensation, pension or retirement pay for service connected disabilities. H. R. 7634 and H. R. 7662, introduced by Representative Rankin, Mississippi, provide for vocational rehabilitation and the return to civil employment of certain persons disabled under circumstances entitling them after discharge or separation from the military or naval forces to a pension or retirement pay. H. R. 7673, introduced by Representative Rogers, Massachusetts, provides that active duty as a member of the Women's Army Auxiliary Corps shall be considered as active military service for the purpose of medical and hospital treatment and domiciliary care under laws administered by the Veterans' Administration.

WOMAN'S AUXILIARY

New Jersey

A Reciprocity Tea was held by the Gloucester County auxiliary in Woodbury recently. Fifty members and guests were present, representing several parent-teacher associations and woman's clubs of the county.

At the May meeting of the Hudson County auxiliary in Jersey City, Mrs. Arthur Largay, former president, showed a picture of the canteen that the auxiliary purchased and gave to the British War Relief Society. A letter was received, from which she read the following: "This is an appreciative line to inform you of the splendid work that has been performed by your up to date Canteen bearing the inscription 'Presented by the Woman's Auxiliary, Hudson County Medical Society, Jersey City, New Jersey, U. S. A.,' now stationed near London. The Vehicle has done good work, such as serving food to demolition workers, making trips to isolated antiaircraft, observation and balloon barrage squads and small camps. When raids occur, whether small or great, Salvation Army canteens rush to the scene. Responsible authorities also greatly appreciate the timely work that these canteens perform and the kindness and sacrifice which has made them possible."

Texas

The Southwest District auxiliary was organized June 26 at Kerrville. Twenty-four women were present and both the Fifth and the Sixth District were well represented. Mrs. P. R. Denman, Houston, state president, assisted. Mrs. S. E. Thompson of Kerrville was elected Council Woman for the Fifth and Sixth districts.

After the meeting a barbecue supper was served at the home of Dr. and Mrs. Thompson. On June 27 Mrs. Walter A. Minsch and Mrs. H. H. Gallatin of Kerrville complimented Mrs. Denman with a breakfast on the lawn of the Gallatin home. A large group from several auxiliaries in the Southwest District attended.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION AND PUBLIC HEALTH.)

CALIFORNIA

New Chief of Child Hygiene.—Dr. Jessie M. Bierman, regional consultant in maternal and child hygiene, U. S. Children's Bureau, has been appointed chief of the bureau of child hygiene of the California State Department of Health, San Francisco. She succeeds Dr. Ellen S. Stadtmuller. Dr. Bierman, who graduated at Rush Medical College in 1927, has served as director of the child welfare division of the Montana State Department of Public Health and assistant director of the division of maternal and child hygiene of the Children's Bureau.

Laboratory of Electroencephalography.—A new laboratory of electroencephalography has been opened at Stanford University School of Medicine, San Francisco. The new instrument has been under construction and adjustment for nearly ten months. At present the new laboratory is being used part of each day for testing by the military services. According to the announcement, the electroencephalograph just completed is unique among such apparatus in that it is entirely remotely controlled, thus avoiding electrical interference. It holds a newly invented automatic calibrating device to give instant interpretation of the currents being recorded. The apparatus consists of four sets of amplifiers housed within a single unit. The Irwin Foundation, San Francisco, has supported the project.

COLORADO

The Annual Friedman Lectures.—The third annual Friedman Lectures and Conferences, given under the auspices of the National Jewish Hospital in cooperation with the Medical Society of the City and County of Denver and the University of Colorado School of Medicine, will be given in Denver November 2-4. On Monday evening November 2, at a joint meeting of the school of medicine and the hospital, Col. John L. Kantor, New York, will discuss "Digestive Symptoms in the Tuberculous and Their Management" and Major Richard H. Meade Jr., Denver, "Extrapleural and Extraperiosteal Pneumonolysis in the Treatment of Pulmonary Tuberculosis." At a joint session of the medical school and society Tuesday evening Colonel Kantor will speak on "Roentgen Study of the Digestive Tract in the Tuberculous," and Major Meade "Management of War Injuries of the Chest." Clinical sessions will be conducted by both speakers on Tuesday and Wednesday.

ILLINOIS

Personal.—Dr. Robert C. Farrier, director of the East Side Health District, East St. Louis, has been appointed defense zone health officer for St. Clair County; Dr. Nordahl O. Gunderson, Rockford, of Winnebago County, and Dr. Sumner M. Miller, Peoria, of Peoria County.——Dr. Frederick L. Eihl, Moline, has been named school physician of Augustana College for the duration of the war, succeeding Dr. Joseph G. Gustafson, Moline, who has entered army service.

Chicago

Lecture on Genetic Variation in Plant Pathogens.—Elvin C. Stakman, Ph.D., St. Paul, chief of the division of plant pathology and botany, University of Minnesota, and pathologist and agent, U. S. Department of Agriculture, will deliver an illustrated lecture on "Genetic Variation in Plant Pathogens and Its Practical Importance" at a joint meeting of the Institute of Medicine of Chicago and the Chicago Society of Internal Medicine, October 23, at the Palmer House.

Grant for Study of Renal Hypertension.—The John and Mary R. Markle Foundation has authorized a grant-in-aid of $7,000 over a two year period for the support of the research in experimental renal hypertension in progress at the University of Illinois College of Medicine. The work is under the direction of Dr. George Wakerlin, professor and head of the department of physiology. Clarence A. Johnson, Ph.D., assistant professor in physiological chemistry, Edwin L. Smith, Ph.D., instructor in physiology, and others are associated in the investigation.

Research Fellowships Available.—Applications for research fellowships in medicine, dentistry and pharmacy in the University of Illinois are now being considered for the year beginning Sept. 1, 1943. Appointments to these fellowships will be announced on January 1. Candidates must have completed a training of not less than eight years beyond high school graduation. The fellowship carries a stipend of $1,200 each calendar year with one month's vacation. Application blanks may be secured from the Secretary of the Committee on Graduate Work in Medicine, Dentistry and Pharmacy, 1853 West Polk Street.

IOWA

Anesthesia Society Proposed.—A group of physicians recently met at the University Hospitals, Iowa City, to discuss the formation of an Iowa Anesthesiological Society. Before plans are completed for a permanent organization, an attempt is being made to learn the extent of interest of the physicians in the state doing this specialty. Dr. Stuart C. Cullen, anesthesia division, University Hospitals, Iowa City, is accepting comments from physicians throughout the state who are practicing anesthesia either part time or full time.

Immunization Program Expanded to Include Diphtheria.—The week of November 9 has been set aside by the state medical society for its annual program of vaccination against smallpox. This year the project has been expanded to include immunization against diphtheria. The state department of health will furnish without cost the preventive agents for the program. It will also arrange payment of carrying charge to local druggists appointed by the county medical society to handle and dispense immunizing agents furnished by the department. This payment will be on the basis of 10 per cent of the cost to the state. The educational features of the program will be worked out in cooperation with local agencies throughout the state.

MINNESOTA

Dr. Fishbein to Lecture in St. Paul and Minneapolis.—Dr. Morris Fishbein, Chicago, Editor of THE JOURNAL, will fill a number of speaking engagements in St. Paul and Minneapolis on October 29-30 under the auspices of the Minnesota Public Health Association. He will address the general session and two sectional meetings of the Minnesota Education Association at the Minneapolis Auditorium. Dr. Fishbein will be the principal speaker at the annual session of the Minnesota Public Health Association in Minneapolis on October 30. On October 29 he will address a group of Christmas Seal volunteer publicity workers in St. Paul. A banquet is planned in his honor at the Nicollet Hotel on October 29.

MISSOURI

County Health Forum.—On October 21 Dr. Hiram Winnett Orr, Lincoln, Neb., will open the annual Jackson County Health Forum with a talk on "Backache and Back Injuries." The forum is sponsored by the auxiliaries of all the accredited hospitals of Jackson County. Other lectures in the series will be:

Dr. Walter C. Alvarez, Rochester, Minn., November 18, Stomach Ulcers.
Dr. Morris Fishbein, Chicago, January 20, Medicine and the War.
Dr. Karl A. Menninger, Topeka, Kan., February 17, Scientific Personality Study.
Dr. Clarence D. Selby, Detroit, March 17, Health, Industry and Manpower.
Dr. Cyrus Sturgis, Ann Arbor, Mich., April 21, Blood Transfusions Throughout the Ages: Their Place in Modern Medicine.

Area Industrial Hygiene Units Organized.—A metropolitan St. Louis Industrial Hygiene Service has been established to meet demands created by the expansion of war production industry in the area and to provide the residents of both county and city with the benefits of a good industrial hygiene program. The full resources of both city and county health departments are available to the metropolitan service under the administration of one director, and an advisory council consisting of the health commissioners and the directors of sanitation and nursing of each department. According to *Industrial Hygiene*, this is the first coordinated industrial hygiene service of its kind. The area served by the service is one of the most highly industrialized areas in the nation both from the peace time and war effort point of view. Mr. Robert M. Brown, formerly supervising engineer of the industrial hygiene service for the St. Louis health department, is the director of the unit which is a joint responsibility of the health commissioners of the city and county. The health departments of Kansas City, Jackson and Clay counties have combined their industrial hygiene personnel to form the Kansas City Area Industrial Hygiene Service. The new unit has the authority to extend services to industry in this area without regard for city or county lines. H. F. Schulte is director and R. A. Carter is industrial hygiene engineer. The services of an industrial hygiene physician are available to the unit on a part time basis from the state board of health.

NEW JERSEY

Memorial to Dr. Ill.—The Academy of Medicine of Northern New Jersey held a memorial meeting October 15 in honor of the late Dr. Edward J. Ill, the academy's first president. A committee has been appointed to consider the creation of a suitable memorial to Dr. Ill.

Survey to Determine Need of Child Care Program.—A statewide study to determine the necessity of a child care program to aid mothers employed in war industries has been approved by the state board of education, newspapers reported, October 4. Charles H. Elliott, Ph.D., commissioner of education for the state, has been authorized to appoint a supervisor. Dr. Elliott, in a statement to the press, stated that there was a general feeling in Washington that women with children younger than 14 years should remain at home and let childless married women fill jobs in war plants, thus releasing their husbands for combat duty.

NEW YORK

Use of Sulfadiazine Discontinued.—Sulfadiazine will no longer be furnished to laboratory supply stations throughout the state for the treatment of pneumococcic infections. The decision was reached by the state department of health in view of the opinion of experts that sulfadiazine does not combat the pneumococcus any more effectively than sulfathiazole. When the present supply of sulfadiazine is exhausted, only sulfathiazole and sulfapyridine will be furnished to the supply stations for the treatment of pneumococcic infections. Reports of toxic reactions, particularly renal reactions, complicating its use have appeared with increasing frequency in the literature, *Health News* reports.

New York City

Latin American Chosen as Salmon Lecturer.—Dr. Emilio Mira, professor of psychiatry at the University of Buenos Aires, Argentina, and formerly full professor of psychiatry at the University of Barcelona, Spain, has been announced as the Salmon Lecturer for 1942, according to the Salmon Committee on Psychiatry and Mental Hygiene of the New York Academy of Medicine. The lectures will be held on three successive Friday evenings, November 6, 13 and 20, in the New York Academy of Medicine Building. The Salmon committee each year selects an outstanding specialist in psychiatry, neurology or mental hygiene to deliver the series of lectures. Dr. Mira will discuss "Psychiatry at War." In his first lecture he will discuss the psychopathology of fear and anger reactions in wartime; in his second lecture, he will discuss the duties of the psychiatrist in wartime and his personal experiences in the Spanish War, and in his third lecture, November 13, Dr. Mira will cover new technics for detecting and controlling "fighting power" in individuals and armies. According to the announcement, in connection with the third lecture on the determination of fighting power, Dr. Mira has originated a new psychological test. The new test has already been applied successfully in England and in Argentina. Dr. Mira received his license in medicine from the University of Barcelona and his medical degree from the Central University in Madrid. He held three full professorships at the University of Barcelona—on the faculty of philosophy, the faculty of economic and social sciences and the faculty of medicine.

NORTH CAROLINA

Highway Marker Honors Physician.—A state highway marker was recently unveiled in honor of the late Dr. Solomon S. Satchwell, founder of the Medical Society of the State of North Carolina and the first president of the state board of health. T. T. Murphy, secretary of the Pender County Board of Health, presented the marker on behalf of the county and of the state of North Carolina to a group of relatives of the late Dr. Satchwell. The marker was unveiled by four grandchildren of the physician. Dr. Satchwell was born in Beaufort County Oct. 26, 1821, and died at his home at Burgaw, Oct. 9, 1892. He graduated at the University of New York in 1850. In 1861 he entered the Confederate Army as the surgeon of the Twenty-Fifth North Carolina Regiment. At the end of the war in 1865 he returned to private practice at Burgaw. Dr. Satchwell was one of the organizers of the North Carolina Medical Society in 1849. He served as president in 1868 and as secretary from 1854 to 1856. He was instrumental in promoting the organization of the state board of medical examiners and served for from 1866 to 1872 as a member. The law of 1877 created the state board of health and designated the state medical society as the constituted board. The medical society met later to set up the board and appoint a committee to carry on the work. Dr. Satchwell was made chairman and continued as such until 1879, when the board was reorganized by the legislature to include nine members. He served as a member of the board from 1879 to 1885 and as president in 1879, 1880 and 1881.

OHIO

Dr. Lavan Joins Infantile Paralysis Foundation.—Dr. John L. Lavan, health commissioner of Toledo and director of health service in Toledo schools, has resigned to become director of scientific research for the National Foundation of Infantile Paralysis, New York, effective October 1. Dr. Lavan, who graduated at the University of Michigan Medical School, Ann Arbor, in 1914, served as health commissioner of Toledo from 1930 to 1931 and as director of public health and welfare at Kalamazoo, Mich., from 1932 to 1935. From 1935 until his recent return to Toledo, Dr. Lavan has been health commissioner of Grand Rapids, Mich.

Resolution Concerning Practice of Physicians in Military Service.—The council of the Ohio State Medical Association in regular session, September 20, adopted a resolution and recommendations for the consideration of all county medical societies urging steps to guarantee restoration of practice and positions vacated by physicians entering military service. The resolution also recommended that the various committees on medical preparedness or a special committee be designated to work out all details and to administer the mechanics of protecting the status of men entering the service as set forth in the resolution. The council also instructed the committee on education of the state medical society to initiate preliminary plans, in cooperation with the medical schools of Cincinnati, Western Reserve and Ohio State universities, for establishing refresher courses for the benefit of Ohio physicians when discharged from military service at the conclusion of the war, without cost to the physicians if such arrangement is feasible. The council also approved the display of a card in physicians' offices reminding patients of military services of their physicians and urging them to resume relationships on their return.

PENNSYLVANIA

War Benevolence Fund.—The Cambria County Medical Society adopted a resolution at its September meeting asking for the establishment of a war benevolence fund for the benefit of its members who are in active military service. The resolution calls for the contribution of $25 a month by all members who remain out of military service and in active practice, the fund to be distributed equitably among members of the society who are in active service. The fund would also be available to families of men in the service in case of need. The resolution also carried further stipulations as to the type of investment and the manner of administration of the fund. It was also provided that all expenses incident to the fund would be paid by the county medical society.

Philadelphia

Lectures for Medical Officers by College of Physicians.—A series of postgraduate lectures has been arranged by the American College of Physicians for medical officers of the armed forces, physicians anticipating early entry on active duty and members of the college. The lectures will be given at the U. S. Naval Hospital, October 20-22. The evening sessions will be devoted to consideration of gastrointestinal problems, blood studies and some of the medical aspects of trauma. The speakers will be:

Dr. Henry L. Bockus, A Classification of Chronic Diarrhea: A Discussion of the Alvine Bloody Fluxes.
Dr. Charles L. Brown, Recent Advances in Our Knowledge of Small Bowel Diseases.
Dr. Joseph C. Yaskin, Functional Gastrointestinal Disturbances.
Dr. Harrison F. Flippin, Toxic Effects of the Sulfonamides on the Blood.
Dr. W. Harding Kneedler, Importance of Blood Examination in Certain Tropical Diseases.
Dr. George E. Farrar Jr., Management of Purpura.
Dr. Walter E. Lee, Crush Syndrome and Burns.
Dr. Jonathan E. Rhoads, Problems of Fluid Balance in the Traumatized Patient.
Dr. Max M. Strumia, Post-Transfusion Reactions (Blood, Serum and Plasma).

The following lectures have been arranged by the college for the fifth annual "round-up" for fellows and associates of the college, October 23, to be given at 4200 Pine Street:

Dr. Edmund C. Boots, Pittsburgh, Thirty-Five Millimeter Films in the Diagnosis of Chest Conditions.
Dr. Ferdinand Fetter, Carcinoma of the Lung.
Dr. Williams S. McCann, Rochester, N. Y., Management of Liver Disease.
Dr. Gordon B. Taylor, Fever Therapy.
Dr. Victor W. Logan, New York, Peptic Ulcer in the U. S. Navy.
Dr. Frederic H. Lewey, Neurotic Reaction in War.

GENERAL

National Safety Congress.—The annual National Safety Congress and Exposition of the National Safety Council will be held at the Hotel Sherman, Chicago, October 27-29. The program will include sessions in air raid precautions for industry, dusts, fumes, gases and vapors, fire safety in war plants, fundamental causes of accidents, gas and electric welding, industrial health, occupational diseases in munitions manufacture, safety engineering exchange, safety in foremanship and war safety problems. Included among the speakers for the session on industrial health are:

Dr. Edward C. Holmblad, Chicago, Industrial Rehabilitation of Permanently Injured Workers.
Dr. Harvey Bartle, Philadelphia, Strains and Hernia.
Dr. James H. Sterner, Rochester, N. Y., Safe Use of Substitute Solvents and Chemicals.
Dr. Frederick W. Slobe, Chicago, What the Industrial Nurse Needs to Know About Hand and Foot Injuries.
Dr. Florence MacInnis, Milwaukee, What the Industrial Nurse Can Do About Tuberculosis.

Shortage of Suitable Sheep Intestines for Sutures.—Sheepmen of the United States can aid surgeons in war zones and at home by use of Leaflet No. 228, just prepared by Merritt P. Sarles, Sc.D., and Aurel O. Foster, Sc.D., of the bureau of animal industry, the U. S. Department of Agriculture announced September 30. Copies of the leaflet, "Nodular Worm Disease of Sheep," may be obtained free from the bureau of animal industry, Agricultural Research Administration, U. S. Department of Agriculture, Washington, D. C. There is a serious shortage in the supply of suitable sheep intestines needed in the manufacture of high quality, absorbable sutures used by surgeons in closing wounds and as ligatures. Casings suitable for the production of surgical sutures must be from sheep free from nodular worms, a common internal parasite. The worms are responsible for thickened or nodular condition in the intestines, which makes them unfit for surgical sutures. Worm infestations are readily preventable by treating the sheep with the drug phenothiazine, given in the feed, in capsules, or in a drench under the supervision of a veterinarian.

Meeting of Life Insurance Medical Directors.—The fifty-third annual meeting of the Association of Life Insurance Medical Directors of America will be held at the Hotel Pennsylvania, Philadelphia, October 21-22, under the presidency of Dr. David E. W. Wenstrand, Milwaukee. The speakers will include:

Dr. Earl C. Bonnett, and Mr. Edward A. Lew, New York, A Mortality Study of Systolic Murmurs.
Col. Eugen I. G. Reinartz, Randolph Field, Texas, Effect of Flight on Man.
Drs. Ernest J. Dewees and Paul H. Langner Jr., Philadelphia, A Study of Glucose Tolerance Tests and the Significance of Glycosuria.
Dr. Gilbert Horrax, Boston, Criteria of Prognosis After Head Injuries with Respect to Longevity and Disability.
Dr. Olin M. Eakins, Pittsburgh, Breaking the Rule of Thumb.
Dr. Frank N. Wilson, Ann Arbor, The Precordial Electrocardiogram.
Drs. Wenstrand and Gamber P. Tegtmeyer, Milwaukee, Significance of Small Numbers of Red and White Blood Cells in the Urine.
Dr. Meredith F. Campbell, New York, Prognostic Considerations of Hematuria and Pyuria.
Lieut. Col. John Keith Gordon, Montreal, Experiences with the Canadian Army in England.
Dr. Edward A. Strecker, Philadelphia, Military Neuropsychiatric Disabilities and Their Treatment.

Award for Vitamin B Research.—Nominations are solicited for the 1943 award of $1,000 established by Mead Johnson and Company to promote research dealing with the B complex vitamins. The recipient of this award will be chosen by a committee of judges of the American Institute of Nutrition, and the formal presentation will be made at the annual meeting of the institute at Cleveland on April 7, 1943. The award will be given to the laboratory (nonclinical) or clinical research worker in the United States or Canada who, in the opinion of the judges, has published during the previous calendar year January 1 to December 31 the most meritorious scientific report dealing with the field of the B complex vitamins. While the award will be given primarily for publication of specific papers, the judges are given considerable latitude in the exercise of their function. Membership in the American Institute is not a requisite of eligibility for the award. The award may be given to a worker for valuable contributions over an extended period but not necessarily representative of a given year. To be considered by the committee of judges, nominations for this award for work published in 1942 must be in the hands of the secretary by Jan. 10, 1943. The nominations should be accompanied by such data relative to the nominee and his research as will facilitate the task of the committee of judges in its consideration of the nomination. Arthur H. Smith, Ph.D., Wayne University College of Medicine, Detroit, is secretary of the American Institute of Nutrition.

SPECIAL NEWS

(THIS NEWS WAS ASSEMBLED ESPECIALLY FOR USE IN THE JOURNAL)

Public Health Under Hitler's Rule.—*Neues Wiener Tageblatt* of July 7 reports that in Bulgaria there are more than eight hundred medical posts vacant. In order to relieve this shortage of doctors it has been decided that one hundred and twenty medical students in their tenth and twelfth semesters, will be absolved from their last examination and will be allowed to carry on their first practical work in the provincial hospitals.

According to *Narodni Prace*, Prague, of July 7 the public health office of Budejovice announces that an x-ray ambulance train will come to Budejovice shortly which will be equipped with the most up-to-date x-ray apparatus and other appropriate instruments, also of the best kind. Specialists will examine free of charge any one interested, above all those who have been affected by some sort of lung disease.

Elefftheron Vima, Athens, of July 12 reports that the doctors and chemists of Salonika have met to study the health situation and to prevent profiteering in medicines. The meeting was attended by the German medical and health officers, who emphasized the help afforded by Germany by the release of substantial quantities of medicines and other medical supplies for the Greek wounded, hospitals and children, by cooperating in the antimalarial campaign, by founding and expanding hospitals and by active assistance in the organization of hygienic services to combat epidemics. In the future German authorities would give the most careful attention to the Greek people. Importation of the best medicines from Germany would assure good treatment. A mixed commission is to superintend the distribution and to insure that there is no speculation. Speculators in medical supplies will receive the severest penalties.

Proinos Typos, Athens, of July 9, in referring to the distribution of quinine, states that supplies will be distributed only to malaria patients who have a medical prescription countersigned by the police and with the name and address of the patient. The ration for a six day treatment (which is the maximum allowed) must not exceed three tubes containing thirty tabloids. Doctors disobeying this rule will be severely punished, and the public is warned against counterfeit supplies not bearing the official packing.

Proinos Typos, Athens, of July 9 reports that, according to an announcement by the government, there are now ample supplies of quinine but that it will be issued only on a doctor's prescription and in quantities for not more than six days.

Akropoliz, Athens, of July 9 reports that chemists refuse to make up prescriptions for those customers who look poor and likely to be unable to pay the enormous prices for medicines, which have increased by 400 per cent in the last month.

According to the *Donauzeitung* of July 12, 28,000 persons in eastern Slovakia have been inoculated against typhoid (bauchtyphus), which claims many victims each year. During March typhoid broke out in the Bartfeld district, but immediate inoculation of 7,000 persons succeeded in localizing the epidemic. The government intends to subsidize the canalization works in order to improve the drinking water, which has hitherto been a frequent bearer of the disease.

Dnevnik, Sofia, of June 20 reports that cases of spotted typhus had risen to more than 200, but only 10 new cases had been disovered in the past week.

According to *Honvedorvos*, 1941, neurotic and mentally depressed members of the Hungarian army are sometimes guilty of self-inflicted injuries, which include "artificial trachoma," hernia, heart trouble induced by poisons, jaundice, gonorrhea, inflammation of the testicles by the action of nettles, edema of the limbs caused by tying braces round them, ulcers and infected wounds.

Dagens Nyneter, Stockholm, of July 14 reports that a number of cases of spotted fever have occurred among Russian prisoners in the Bodoe area. The whole area around the German fish factory, A/S Frostfilet, has been closed because of the danger of contagion. The first cases occurred shortly after the arrival at Bodoe on June 20 of eight hundred Russian prisoners, who are working there for the Germans. A few cases have also been reported from Mosjoen. The sugar ration for smokers will be reduced to 500 Gm. a month, according to *Karjala*, Viipuri, of August 21; however, nonsmokers will not obtain an extra sugar ration of 250 Gm. when tobacco rationing starts. When the Ministry of Supply announced the choice between tobacco and sugar it was understood that nonsmokers would obtain an extra sugar ration of 250 Gm.; if a misunderstanding existed at this time it was said to have been due to "the clumsiness of the Supply Ministry."

Foreign Letters

LONDON

(From Our Regular Correspondent)

Sept. 5, 1942.

Famine in Europe

Food conditions in a large part of the European continent occupied by the Germans are deplorable. A famine relief committee formed by church leaders has collected evidence. In Greece famine was so severe that 320,000 deaths were registered from August 1941 to the end of March 1942, which amounted to five times the normal death rate. In December the average daily consumption of bread had been reduced from the normal 27 ounces to 2½ ounces or less. In January 900 deaths daily from famine were reported. The children were most affected, and their resistance to an epidemic of diphtheria, which swept Athens and the Piracus, was impaired. Some alleviation of the conditions in the Greek cities has taken place as a result of food shipments organized by the Allied governments.

In Belgium starvation edema has appeared and scurvy, rickets, anemia, skin diseases and eye disorders are becoming common. Two thirds of the school children get little breakfast and a third get an inadequate midday meal. In unoccupied France conditions are similar to those of 1918; infant mortality increased 45 per cent between 1939 and 1940. In occupied France a reasonable standard of living is possible only in the rural districts. In the House of Commons Mr. Dingle Foot, parliamentary secretary to the Ministry of Economic Warfare, stated that in occupied Europe the urban populations were living at a level below, and in some cases substantially below, the standards of peacetime. In Belgium and France there had been during the past two years an increase in the incidence of certain diseases, notably pneumonia and tuberculosis, for which an insufficient diet was no doubt one of the principal causes. By agreement with the British government, importation of food for the people in the blockaded area is allowed. Over the last thirteen months the Belgian government has purchased foodstuffs from the Portuguese. The British government would welcome the expansion of the scheme under which Belgian children, whose health has suffered, are sent to Switzerland, and is always willing to grant navicerts to the Swiss government to help to clothe and feed these children. It has also considered many schemes for what is called "controlled relief" in enemy occupied territories but found that they would all bring benefit, in some cases substantial, to the enemy.

In Poland the rations allowed are on a starvation level and the Jews get still less than the Poles. The British Famine Relief Committee, which includes every section of Christian and Jewish thought, is planning to send food and medical aid to occupied countries wherever this is possible. A German guaranty that it would not be used for the armies seems to have been observed. The American Friends Service Committee gives supplementary school meals to 85,000 children in unoccupied France and is supplementing feeding in refuge camps. A commission for Polish relief has been able to carry out controlled relief of 50,000 children.

Anemia and Leukopenia in X-Ray Workers

In the hospitals of the Emergency Medical Service (established for the treatment of war casualties) some workers in the x-ray department were taken off work because they were thought to be suffering from minor degrees of anemia due to the x-rays. But the director general of the service has declared this action unnecessary, as the anemia is almost certainly not due to the action of the rays. To allay uneasiness and as a guide to the treatment of such cases he has issued the following note to all the hospitals of the Emergency Medical Service:

Periodic examination of x-ray workers has been carried out in many institutions for many years. In not one has a single case of aplastic anemia occurred, and there appears to be no record of it developing in any worker who was not also in contact with radium. A few cases of secondary anemia occur from time to time and appear to be due to the conditions of employment rather than to any specific action of the rays. Rare examples have been met in which the leukocyte count has been seriously reduced, but recovery has quickly followed short absence from work. An extremely rare example has been observed in King's College Hospital of a girl who, on return to work, developed severe leukopenia for the second time. She was advised to find some other occupation.

It is generally agreed that periodic blood examinations, at intervals of six to twelve months, are advisable for the detection of hemoglobin and red cell deficiencies in persons working under unfavorable surroundings, and of the very exceptional x-ray worker who may develop serious leukocyte deficiency. A blood examination of all candidates for employment in an x-ray department is a reasonable procedure. Minor degrees of anemia need not be treated more seriously in radiographers than in other occupations. Minor degrees of leukopenia should suggest further examination at short intervals, such as two weeks, and if confirmed and progressive should entail removal from work until the blood state is reestablished and the count found to remain constant. The term "x-ray anemia" has no particular meaning and should be avoided.

How the British Army Is Fed

At the War Department Laboratory, London, a demonstration was given of how scientific research has been harnessed to the task of feeding a great army. The services of a number of research organizations are used. These include the Department of Scientific and Industrial Research, the Directorate of Scientific Research, the Ministry of Supplies, the Scientific Adviser, the Ministry of Food, the Research Institute and the Medical Research Council. The organization to feed our armies is worldwide. It is run by business men from civil life, who may be described as "experts in khaki," and by administrative staff officers who combine a knowledge of army needs with a wide knowledge of organization and of those parts of the world where troops are stationed. During training the soldier is given the fullest and most varied ration which war conditions in Britain permit. Increased allowances of nationally rationed foods are given to build up his physique to withstand the strain of hard training and to prepare him for the greater strain of war. For active service the ration must be adequate, yet limited in weight, palatable, sustaining and immediately ready to eat after months of storage. For the armored fighting vehicle there is a ration designed to be carried in the mess tin and yet adequate to sustain a man for forty-eight hours. For a man fighting in the arctic regions there is a special ration. There is an emergency ration for a man who for a time is cut off from supplies. It consists of cocoa powder, milk protein, cocoa butter and icing sugar. For the extraordinary variety of peoples now incorporated in the British army—Singhalese, Gurkhas, Moslems, Hindus, Czechs, Poles, Syrians, French, Yugoslavs, Kaffirs and others—there are special ration scales to meet their requirements. From the Middle East reports have recently been received showing complete satisfaction with the ration.

At the demonstration, samples of German rations captured in Libya were displayed. The British samples compared favorably with them. The British are more palatable, and analyses have shown that in the process of dehydration the Germans have failed to retain vitamin C. One of the few things in their ration which is not ersatz is the German sausage. The soup made from their powder is less attractive than that supplied to

the British soldier. Their rye bread and biscuit do not compare with those provided for our men. What was called "the dog biscuit" of the last war has gone forever. The biscuit we now supply contains more sugar and fat, has a high calory value and keeps for a good time. Plum and apple jam are no more. We now give a variety of jams—gooseberry, raspberry, black currant, mixed fruits and marmalade. Pills which the Germans claim give "pep" to their panzer troops have been taken from soldiers captured in the Middle East and analyzed. They consist of a low grade sugar and are not equal to the boiled sweets which form part of the British soldier's ration.

Other things shown at the demonstration included a powder consisting of tea, sugar and milk, from which tea can be made direct, and an emergency ration which looked like a bar of chocolate and, while weighing only 6 ounces, gives 800 calories of energy. For the troops overseas one hundred and thirty different ration scales have to be supplied. Almost forty of these are for the Middle East alone. Dehydrated products, some of which are still in the experimental stage, were shown. These will be of great value for places like Gibraltar but are of little value for desert warfare. Canned vegetables and meat are much better. One myth was exploded. There is no method of feeding men on tablets. Moisture and bulk are an essential part of human diet. But everything possible has been done to compress a satisfying day's food into the smallest space possible. So far the health of our army has been better than it has ever been in peacetime. There has been no case of dietetic deficiency.

The British Figure Improves with Rationing

Under our rationing system every one has enough food for the maintenance of health but most of us have much less than what we would like to eat of many important foods, such as meat, butter, sugar and eggs. Addressing a meeting, Lord Woolton, minister of food, said that, while the stocks in this country of food were still considerably greater than at the outbreak of war, a time might come when it would be necessary for us to have still less meat. He appealed to people to eat more potatoes and blamed the slimming craze of a few years ago for the fall in the consumption of potatoes, because people said that they were fattening. He added "Of course they were, when you had as much butter, sugar and sweets as you wanted. Now I have helped you. I have come to the rescue of the feminine figure. You cannot get fat on your diet now. Don't worry about getting fat; don't worry about your figure. The government is looking after that for you. They have taken away your petrol, so that you will have much more exercise. We have done everything that a reasonable government can do to look after the human form divine."

Honorary Fellowship of Royal Society of Medicine

Eleven distinguished members of the profession, representing Britain, the dominions and the United States have been elected to the honorary fellowship of the Royal Society of Medicine. The two British ones are Lord Horder and Sir John Herbert Parsons (ophthalmologist), a former president of the society. From Canada there are Prof. W. E. Gallie, dean of the Medical Faculty of the University of Toronto, and Prof. Jonathan Meakins, director of the Department of Medicine, McGill University. From Australia there are Sir Charles Blackburn, consulting physician, Royal Prince Alfred Hospital, Sydney, and Sir Hugh Devine, lecturer in surgery, University of Melbourne. New Zealand is represented by Sir Henry Lindo, professor of ophthalmology and dean of the medical faculty, Otago University, and South Africa by Dr. A. W. Falconer, professor of medicine, University of Capetown. From the United States there are Dr. Hugh Cabot, consulting surgeon, Mayo Clinic; Dr. David Cheever, associate professor of surgical anatomy, Harvard (who had charge of the Harvard Surgical Unit in the last war), and Dr. W. T. Longcope, physician-in-chief, Johns Hopkins Hospital.

BUENOS AIRES

(From Our Regular Correspondent)

Sept. 5, 1942.

Public Health in Chile

No epidemics have occurred since 1939 in Chile, according to official reports, with the exception of some cases of exanthematic typhus, which were immediately controlled. The efforts to control malaria in the northern parts of the country have given good results. The mortality in early childhood was exceedingly high (THE JOURNAL, Jan. 10, 1942, p. 159) but the feeding of mothers and children has been given much attention of late and in a short time the general condition of mothers and children should improve. Negotiations are under way for extending to the whole family the benefits of insurance in the Caja de Seguro Obligatorio for medical care. Now only infants of an insured parent are given medical care by the insurance company. By the new plan 3,600 persons will have the right to ask for medical care under this insurance and 200,000 or more children, who at present have no medical care. The administration of rations in public government restaurants free of charge to poor families has improved the health of the people. In 1940, thirty public restaurants gave more than four million rations to more than 1,200,000 persons, and more than one and a half million rations of breakfast and lunch were given to school children.

Control of Venereal Diseases in Peru

Laws concerning the medical care of patients with venereal diseases were recently promulgated by the president of Peru. A national department against venereal diseases was recently established with headquarters in Lima. Treatment of venereal diseases in the period of contagion is obligatory. If the patients are minors or mentally deficient, the parents are responsible for their treatment. Drugs for the treatment of venereal diseases are now sold only on medical prescriptions. Specific medicines against venereal diseases and treatment by correspondence are prohibited. Wet nurses must have a certificate of health. These medical certificates are given without any charge in the dispensaries and hospitals of the city. They are good only for three months, when a new one is required. Five per cent of the total number of beds in hospitals of public aid are going to be reserved for patients with venereal diseases.

Crusade Against Coca in Colombia

The minister of hygiene and social aid of Colombia recently promulgated a law by which the cultivation of Erythroxylon coca and its varieties are regulated by the government. A census will be made in the next four months in which the name of the owners of coca plantations, the number of trees, the size of the fields, the amount of coca harvested every year and the form in which coca leaves are sold will be recorded. The sale of coca leaves then will be prohibited unless the owners obtain a license from the authorities. One month after the publication of the law, no new plantations of coca will be permitted. The plantations on national or municipal property are to be immediately destroyed by the authorities.

Pan American Congress of Endocrinology

A conference was recently held with Dr. Bernardo A. Houssay as chairman for the appointment of an executive committee of the third Pan American Congress of Endocrinology, which will be held in Buenos Aires, July 1-6, 1943. The official topics will be (1) endocrine factors of diabetes, (2) gonadotropins and (3) the adrenal cortex. There will also be several lectures on endocrinology. The official headquarters of the executive committee of the congress is the Instituto de Fisiología de la Facultad de Ciencias Médicas of Buenos Aires, Calle Córdoba 2122. Letters requesting information should be sent to Dr. Eduardo Braun Menéndez, the secretary of the congress, at that address.

Deaths

Samuel Bates Grubbs ● Medical Director, U. S. Public Health Service, retired, Carmel, Ind.; Columbia University College of Physicians and Surgeons, New York, 1896; became associated with the U. S. Public Health Service in 1897 and continued in that work until 1933; served as chief quarantine officer of the Panama Canal Zone in 1919-1920, sanitary inspector for the U. S. Army port of embarkation, New York, 1917-1918; health officer for the port of New York from 1921 to 1925; chief of the foreign quarantine division from 1925 to 1927; director of the Great Lakes district during 1928 and the next year served as adviser to the Los Angeles health department; chief quarantine officer for the Hawaiian Islands from 1929 to 1933; veteran of the Spanish-American War and World War I; originated the vacuum cyanide method of disinfecting clothing and rat proofing ships and the cheopis index for bubonic plague; aged 71; died, September 19, in Poughkeepsie, N. Y., of coronary thrombosis.

Frank Vinsonhaler, Little Rock, Ark.; College of Physicians and Surgeons, New York, 1885; dean from 1927 to 1939 and since then emeritus dean, appointed professor of ophthalmology, otology, rhinology and laryngology in 1893, and since 1932 professor of medical history and ethics at the University of Arkansas School of Medicine; member and past president of the Arkansas Medical Society and the Pulaski County Medical Society; member of the American Academy of Ophthalmology and Otolaryngology; fellow of the American College of Surgeons; served as a commander of a base hospital in France during World War I; formerly a colonel in the medical officers' reserve corps; specialist certified by the American Board of Ophthalmology; in 1935 was awarded a medal by Columbia University, New York, for conspicuous service rendered to the university; aged 78; died, September 1, of pneumonia.

William Forsyth Milroy, Los Angeles; College of Physicians and Surgeons, New York, 1883; formerly professor emeritus of clinical medicine at the University of Nebraska College of Medicine, Omaha; past president of the Nebraska State Medical Association and the Douglas County Medical Society; fellow of the American College of Physicians; at one time on the staffs of the Immanuel, Douglas County, Clarkson Memorial and the University of Nebraska hospitals, Omaha; discoverer of Milroy's disease; aged 86; died, September 21, of cardiac decompensation and cerebral artery thrombosis.

Montgomery Hunt Sicard, Westerville, N. Y.; Columbia University College of Physicians and Surgeons, New York, 1898; member of the Medical Society of the State of New York; formerly instructor of physical diagnosis at Cornell University Medical College, New York; aged 70; died, September 22, in a hospital at Utica of cerebral thrombosis and arteriosclerosis.

William Warren Southwick ● Marshalltown, Iowa; Chicago College of Medicine and Surgery, 1913; past president of the Marshall County Medical Society; formerly county coroner; aged 55; secretary and past president of the medical staff of the Evangelical Deaconess Home and Hospital, where he died, September 14, of ruptured duodenal ulcer and uremia.

Richard Lambert Shea, North Scituate, R. I.; Keokuk (Iowa) Medical College, 1894; formerly served as medical examiner of Scituate; at one time first assistant physician at the Eastern Indiana Hospital for Insane, Richmond; aged 72; died, September 5, in the Rhode Island Hospital, Providence, of hypertensive cardiovascular disease and bronchopneumonia.

Harold Glover Horton, Saltillo, Pa.; Medico-Chirurgical College of Philadelphia, 1912; member of the Medical Society of the State of Pennsylvania; past president of the Huntingdon County Medical Society; served as a member of the board of education; aged 55; died, September 2, in the J. C. Blair Memorial Hospital, Huntingdon, of coronary thrombosis.

Armand Ernest Larose, South Ryegate, Vt.; School of Medicine and Surgery of Montreal, Faculty of Medicine of the University of Laval at Montreal, Que., Canada, 1916; chief surgeon of the Women's Hospital, Montreal, from 1929 to 1937; aged 51; died, August 21, in the Grace Dart Hospital, Montreal, of pulmonary tuberculosis.

Edward J. Farnum, Fort Meyers, Fla.; Bennett College of Eclectic Medicine and Surgery, Chicago, 1889; became emeritus professor of the practice of surgery at his alma mater in 1906; at one time a member of the consulting staff of the Cook County Institutions at Dunning; aged 81; died, August 29, of coronary thrombosis.

John Laurence O'Toole, Haverhill, Mass.; Tufts College Medical School, Boston, 1908; medical examiner of the fourth district of Essex County; formerly served as a member of the city board of health and board of education; aged 64; on the staff of the Hale Hospital, where he died, September 2, of coronary thrombosis.

Luigi Saverio Michela, Paterson, N. J.; Regia Università di Torino Facoltà di Medicina e Chirurgia, Italy, 1900; member of the Medical Society of New Jersey; served during World War I; attending obstetrician on the staff of St. Joseph's Hospital; aged 66; died, August 21, of acute myocarditis.

Thomas Tilden Norris, Krebs, Okla.; University of Nashville (Tenn.) Medical Department, 1901; member of the Oklahoma State Medical Association; assistant physician of the Central Oklahoma State Hospital Annex, McAlester, since Sept. 1, 1939; aged 65; died, September 6, of cholangitis.

Ernest Day Everett, Lakeview, Ore.; George Washington University School of Medicine, Washington, D. C., 1908; member of the Oregon State Medical Society; at one time physician in the Indian Service; on the staff of the Lakeview Hospital; aged 64; died, August 16, of aortic stenosis.

William James Cochran, Natick, Mass.; Harvard Medical School, Boston, 1887; member of the Massachusetts Medical Society; formerly chairman of the board of health of Natick; aged 80; a trustee of the Leonard Morse Hospital, where he died, August 29, of arteriosclerotic heart disease.

William Kirk Fast ● Atchison, Kan.; John A. Creighton Medical College, Omaha, 1914; past president of the Atchison County Medical Society; served as city and county health officer; past president of the staff of the Atchison Hospital; aged 53; died, August 31, of coronary occlusion.

William Homer Axford ● Chester, N. J.; University of Pennsylvania Department of Medicine, Philadelphia, 1901; at one time mayor of Bayonne; formerly on the staff of the Bayonne (N. J.) Hospital; aged 68; died, September 16, in St. Petersburg, Fla., of coronary occlusion.

Harry Edmond Downs, Alexandria, La.; Medical Department of Tulane University of Louisiana, New Orleans, 1902; veteran of the Spanish-American War; aged 71; died, September 9, in the Veterans Administration Facility of hypertensive and arteriosclerotic heart disease.

Oscar Anderson ● Santa Monica, Calif.; Dunham Medical College, Chicago, 1902; served in the medical corps of the U. S. Army during World War I; aged 68; died, September 6, in a hospital at Long Beach of injuries received when struck by an automobile as he was crossing the street.

Irwin Seth Walker, Rangoon, Burma; College of Medical Evangelists, Los Angeles, 1937; L.R.C.P., L.R.C.S., Edinburgh, and L.R.F.P. & S., Glasgow, 1938; associated with the American Seventh Day Adventist Mission; aged 34; died, August 4, in Bombay, India, of spinal meningitis.

Albert Alexander Roth ● Chicago; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1905; formerly member of the city board of health; aged 67; died, August 27, in the Presbyterian Hospital of papillary carcinoma of the bladder.

George Robert Reinhold Hertsberg ● Stamford, Conn.; Dartmouth Medical School, Hanover, N. H., 1899; fellow of the American College of Surgeons; aged 68; on the staff of the Stamford Hospital, where he died, September 17, of carcinoma of the pancreas.

Charles Reed, Towanda, Pa.; Jefferson Medical College of Philadelphia, 1880; member of the Medical Society of the State of Pennsylvania; for many years examiner for the U. S. Pension board; aged 85; died suddenly, September 4, of coronary thrombosis.

Samuel Early Centerfit, Montgomery, Ala.; New York University Medical College, New York, 1898; member of the Medical Association of the State of Alabama; aged 68; died, September 1, in Birmingham of prostatic hypertrophy and pyonephrosis.

Samuel Claude Harrell Jr., Monahans, Texas; Vanderbilt University School of Medicine, Nashville, Tenn., 1937; member of the State Medical Association of Texas; aged 29; died, September 6, of injuries received in an automobile accident.

John Frampton Bryson, Girardville, Pa.; Jefferson Medical College of Philadelphia, 1903; county deputy coroner and bank president; aged 72; died, September 9, in the George F. Geisinger Hospital, Danville, of coronary thrombosis.

Charles Clarence Rose, Oklahoma City; University of Louisville (Ky.) Medical Department, 1912; served during World War I; on the staff of the Southwest Medical Clinic; aged 52; died, September 5, of coronary thrombosis.

Arthur E. Wyman, Sabattus, Maine; Baltimore Medical College, 1906; aged 70; died recently in the Central Maine General Hospital, Lewiston, of injuries received when struck by an automobile as he was crossing the street.

William Manning Tappan ● Holland, Mich.; University of Michigan Medical School, Ann Arbor, 1916; health officer of Holland; on the staff of the Holland City Hospital; aged 53; died, September 12, of coronary thrombosis.

Jacob Meyer Heyde, Loudonville, Ohio; Jefferson Medical College of Philadelphia, 1900; served during World War I; formerly member of the school board; aged 64; died, September 2, of cardiovascular disease.

Norman Carl Reglien, Michigan City, Ind.; University of Michigan Medical School, Ann Arbor, 1928; aged 39; on the staff of St. Anthony Hospital, where he died, September 11, of myocardial infarction.

Joseph Powell Wimberley, Halifax, N. C.; Jefferson Medical College of Philadelphia, 1899; aged 65; died, August 14, in the Rocky Mount Sanitarium, Rocky Mount, of arteriosclerotic heart disease.

Harry H. Stretton, Ingleside, Neb.; Cotner University Medical Department, Lincoln, 1895; assistant superintendent of the Hastings State Hospital; aged 75; died, September 7, of coronary thrombosis.

Robert Pythian Hackley, Medaryville, Ind.; Kentucky School of Medicine, Louisville, 1900; formerly served as county health officer; aged 71; died, August 30, of cerebral hemorrhage and arteriosclerosis.

John Lovell Hanchette, Oakland, Calif.; Chicago Homeopathic Medical College, 1889; formerly a member of the board of education of Sioux City, Iowa; aged 82; died, August 29, of pulmonary edema.

John Larkin Walker, Hillsboro, Ohio; University of Cincinnati College of Medicine, 1931; member of the Ohio State Medical Association; aged 36; was found dead, September 12, of heart disease.

Sterling S. Brown ● Pleasant View, Ky.; Hospital College of Medicine, Louisville, 1896; member of the Tennessee State Medical Association; aged 71; died, September 4, of heart block.

Arthur Francis Daly ● Chicago; Loyola University School of Medicine, Chicago, 1922; on the staff of the Roseland Community Hospital; aged 47; died, September 13, of coronary thrombosis.

James Dave Edmundson, Orland, Calif.; Missouri Medical College, St. Louis, 1888; past president of the Glenn County Medical Society; aged 85; died, August 21, of cardiac decompensation.

David W. Shellabarger, Potsdam, Ohio; Medical College of Ohio, Cincinnati, 1892; member of the Ohio State Medical Association; aged 74; died, August 18, of carcinoma of the prostate.

Hugo Victor Pribyl ● Chicago; Rush Medical College, Chicago, 1899; on the staff of the Jackson Park Hospital; aged 71; was found dead, September 20, of a self-inflicted bullet wound.

Leopold Adler ● Detroit; University of Kolozsvar, Hungary, 1913; served on the staff of the Woman's Hospital; aged 59; died, August 17, of nephritis, uremia and cerebral thrombosis.

George N. Springer, Hohenwald, Tenn.; Memphis Hospital Medical College, 1897; aged 74; died, August 30, in the King's Daughters' Hospital, Columbia, of bronchopneumonia.

Archie Tilden Gibson ● Morrisonville, Ill.; Barnes Medical College, St. Louis, 1896; aged 69; died, September 9, in the Missouri Baptist Hospital, St. Louis, of cerebral hemorrhage.

Joel Dixon Sturdevant ● Noblesville, Ind.; Medical College of Indiana, Indianapolis, 1904; served during World War I; aged 64; died, August 31, of cirrhosis of the liver.

John Franklin Mouton, Lafayette, La.; College of Physicians and Surgeons, Baltimore, 1889; member of the Louisiana State Medical Society; aged 74; died, September 3.

Lewis Cass White, Colorado Springs, Colo.; College of Physicians and Surgeons, Keokuk, Iowa, 1892; aged 84; died, September 10, of cardiovascular renal disease.

Neal Davidson Monger, San Benito, Texas; University of Texas School of Medicine, Galveston, 1922; aged 44; was found dead, August 19, of coronary thrombosis.

Robert Lee Murph, Dyersburg, Tenn.; Kentucky School of Medicine, Louisville, 1891; aged 73; died, August 26, in St. Joseph's Hospital, Memphis, of pellagra.

Horace Wilbert Brown, Chattanooga, Tenn. (licensed in Tennessee in 1902); aged 78; died, August 23, in Urbana, Ill., of cerebral hemorrhage and arteriosclerosis.

Raphael Aredis G. Constantian, New York; University of Edinburgh Faculty of Medicine, Scotland, 1893; aged 71; died, September 10, of coronary occlusion.

Thomas Edward Blackshear, Pensacola, Fla.; University of Maryland School of Medicine, Baltimore, 1894; aged 71; died, September 7, of coronary occlusion.

Hughes George Meaker ● Mansfield, Pa.; Medico-Chirurgical College of Philadelphia, 1914; aged 56; died, August 21, of streptococcic pneumonia.

Cornelis Schagen, Oakland, Calif.; Universiteit van Amsterdam Geneeskunde Faculteit, Netherlands, 1901; aged 68; died, August 7, of coronary embolism.

Marks Priestley Hine, Philadelphia; Jefferson Medical College of Philadelphia, 1888; also a druggist; aged 83; died, September 2, of heart disease.

Joseph W. Taylor, Huntsville, Mo.; Jefferson Medical College of Philadelphia, 1878; aged 87; died, September 10, of carcinoma of the stomach.

Martin Johnson Bartlett, Oklahoma City; Hospital College of Medicine, Louisville, Ky., 1906; aged 71; died, September 5, of heart disease.

Rufus King Noyes, Boston; Dartmouth Medical School, Hanover, N. H., 1875; aged 89; died, August 31, in Atkinson, N. H., of myocarditis.

Anson P. Howland, Cleveland; Western Reserve University Medical Department, Cleveland, 1896; aged 72; died, August 28, of heart disease.

James Christian Spiegel, Buffalo; University of Buffalo School of Medicine, 1878; aged 86; died, August 8, of uremia and nephrosclerosis.

Alphonso L. Shackelford, Dallas, Texas (licensed in Texas under the Act of 1907); aged 74; died, September 12, of coronary occlusion.

Thomas J. Appleton, Seattle; Chicago Homeopathic Medical College, 1890; aged 79; died, August 22, of arteriosclerosis and heart disease.

Uryal C. Ambrose, Cumberland, Ind.; Louisville (Ky.) Medical College, 1887; aged 79; died, September 3, of cerebral hemorrhage.

Edward James Hogan, Overland, Mo.; American Medical College, St. Louis, 1894; aged 77; died, September 1, of coronary occlusion.

George Albert McEvoy, Newton, Mass.; Harvard Medical School, Boston, 1899; aged 68; died, August 19, of coronary sclerosis.

Charles Raymond Holshue, Shamokin, Pa.; Jefferson Medical College of Philadelphia, 1891; aged 72; died, September 10.

Ernest A. Green, Grayville, Ill.; Barnes Medical College, St. Louis, 1898; aged 70; died, August 29, of myocarditis.

Thomas Jefferson Case, Delmont, S. D.; Rush Medical College, Chicago, 1889; aged 79; died, September 4.

DIED WHILE IN MILITARY SERVICE

Herman Finkelstein, Roseland, N. J.; Long Island College of Medicine, Brooklyn, 1934; member of the Medical Society of New Jersey; formerly school physician; was called to active duty as a first lieutenant in the medical reserve corps of the U. S. Army, March 6, 1941; appointed a captain June 29 of this year; was stationed at Huntsville, Ala., where he died, September 9, of acute brain abscess, complicating acute catarrhal nasopharyngitis, aged 33.

Millard Null Lawrence, Philadelphia; Temple University School of Medicine, Philadelphia, 1937; resident in surgery at the Temple University Hospital; was called to active duty as a lieutenant (junior grade) M C-V (G) U. S. Naval Reserve on August 16 of this year; aged 30; died, September 6, near Creeds Field, Creeds, Va., of injuries received in an airplane accident.

William Lee Tucker ● Cullman, Ala.; Tulane University of Louisiana School of Medicine, New Orleans, 1928; first lieutenant in the medical corps of the U. S. Army stationed at Camp Polk, La.; on the staff of the Cullman Hospital; aged 40; was run over by a train and killed, July 17, at DeQuincy, La.

Bureau of Investigation

DANGEROUS TO HEALTH

When Used as Directed

[EDITORIAL NOTE.—These abstracts differ from other abstracts of Notices of Judgment issued by the Food and Drug Administration of the Federal Security Agency which have appeared in these pages in that they include reference to the fact that these nostrums were specifically declared to be dangerous to health when used in accordance with the directions given on the label by the manufacturer. The abstracts that follow are given in the briefest possible form: (1) the name of the product, (2) the name of the manufacturer, shipper or consignor, (3) the date of shipment, (4) the composition, (5) the type of nostrum, (6) the reason for the charge of misbranding and (7) the date of issuance of the Notice of Judgment—which is considerably later than the date of the seizure of the product and somewhat later than the conclusion of the case by the Food and Drug Administration.]

Aspirol Tablets.—J. R. Watkins Company, Winona, Minn. Shipped between July 3, 1939 and April 19, 1940. Composition: acetylsalicylic acid, acetophenetidin and caffeine citrate. Declared misbranded because dangerous to health when used in the dosage or with the frequency or duration prescribed, recommended or suggested in the labeling; further misbranded because name falsely indicated chiefly aspirin present and amount of acetophenetidin not declared on the label.—*[D. D. N. J., F. D. C. 328; March 1942.]*

Bromo-Thein.—Lockwood Laboratories, Hammond, Ill. Shipped Aug. 28, 1940. Composition: acetanilid with sodium and potassium bromides. Misbranded because statement on label "Each heaping teaspoonful contains 2½ grains acetanilid, 2½ grains sodium bromide, 2½ grains potassium bromide" was false; further misbranded because label failed to bear adequate warnings against taking the product in those pathological conditions wherein its use might be dangerous to health or cautionings against unsafe dosage, methods or duration of administration in which its frequent or continued use might cause serious blood disturbances, mental derangement and other serious effects.—*[D. D. N. J., F. D. C. 281; November 1941.]*

Bull's 1001 Obesity Capsules.—J. W. Bull, Chicago. Shipped March 24, 1939. Composition: thyroid and small amounts of sulfur, licorice and nux vomica. Misbranded because dangerous to health if taken as labels directed.—*[D. D. N. J., F. D. C. 153; April 1941.]*

Ealy's (Dr. T. F.) Baby Powders.—L. O. Ealy, Steubenville, Ohio. Shipped April 9, 1940. Composition: calomel, plant material, calcium carbonate and a small amount of saccharin. Dangerous to health when used as recommended on label as a mild laxative for children.—*[D. D. N. J., F. D. C. 277; November 1941.]*

Eczmatone.—Barlow Chemical Association, Oklahoma City, Okla. Shipped April 11, 1940. Composition: essentially alcohol (85 per cent), mercuric chloride (0.37 per cent) and water. Misbranded because label falsely represented it as aiding nature in promoting healing, and efficaciously treating minor irritating skin and scalp disorders, sprains, minor aches and pains and burning, itching, loose, scaly dandruff. Further misbranded because dangerous to health when used as recommended on label.—*[D. D. N. J., F. D. C. 278; November 1941.]*

Flu-Go.—Flu-Go Chemical Company, Bessemer, Ala. Shipped Jan. 22, 1940. Composition: essentially mineral oil, ephedrine and aromatics including camphor and rose oil. Misbranded because label falsely represented that the product constituted an efficacious treatment for influenza; further misbranded because label did not accurately state the quantity of the contents; also misbranded because label failed to contain warning that the product might be dangerous to health if taken as recommended.—*[D. D. N. J., F. D. C. 282; November 1941.]*

Hexadrin.—Murray Products Company, San Francisco. Shipped Nov. 6, 1939. Nasal device for injecting oily medicament into the nostrils. Misbranded because dangerous to health if used as directed in the labeling.—*[D. D. N. J., F. D. C. 148; April 1941.]*

Ka-Ho-Mor.—A. G. Luebert, Coatesville, Pa. Shipped April 23, 1940. Composition: acetanilid, caffeine and aspirin. Misbranded because dangerous to health when used as suggested on labels and because falsely represented to be a safe and appropriate treatment for various pains, aches and head colds.—*[D. D. N. J., F. D. C. 143; April 1941.]*

Migro Headache Powder.—C. J. Czarnecki, Detroit. Shipped Feb. 6, 1940. Composition: essentially acetanilid, sodium bicarbonate, tartaric acid and milk sugar. Adulterated and misbranded because acetanilid content per powder was greater than the 5 grains declared on the label. Further misbranded because falsely represented as a safe and appropriate treatment for simple headache, whereas it was dangerous to take as recommended.—*[D. D. N. J., F. D. C. 146; April 1941.]*

Nervease Headache Powders.—Nervease Company, Boston. Shipped March 27, 1939. Composition: in each powder, 4.6 grains of acetanilid and 0.87 grain of caffeine, with milk sugar and pink coloring. Misbranded because, among other things, falsely represented as efficacious for headache, whereas it was dangerous to health if taken as the label suggested.—*[D. D. N. J., F. D. C. 147; April 1941.]*

Neuroloo.—Link Chemical Company, Emporia, Kan. Shipped Jan. 30, 1940. Misbranded because it contained more than the 60 grains of sodium bromide declared on the label and less than the 25 per cent of alcohol declared, and because dangerous to health when used as recommended on the label.—*[D. D. N. J., F. D. C. 145; April 1941.]*

One Minute Toothache Stick.—One Minute Remedies Company, St. Louis. Shipped April 12, 1940. Composition: essentially carbolic acid (23 per cent), paraffin, cotton and small amounts of clove and cinnamon oils. Misbranded because dangerous to health when used as directed on label and not efficacious for certain conditions specified.—*[D. D. N. J., F. D. C. 330; March 1942.]* Another Notice of Judgment, *N. J., C. P. 103* was issued against this product in May 1942 under the Caustic Poison Act. In this case it was charged that the preparation contained a dangerous caustic or corrosive substance (carbolic acid) in a concentration of 5 per cent or more, and that the packages were misbranded in that the label did not bear the word "Poison" or any directions for treatment in case of accidental personal injury from the use of the preparation.

Pachanga Mineral Water.—Tripo M. Lukovich trading as T. M. Lukovich, D. C., Elsinore, Calif. Shipped between Sept. 5 and Nov. 25, 1940. Composition: essentially the chloride, sulfate, carbonate and bicarbonate of sodium with a fluorine compound and a trace of an iron compound, dissolved in water. Total amount of dissolved matter was 2 per cent. For the relief of certain stomach, bowel, liver and kidney disorders. Declared misbranded because dangerous to health when used as directed in the labeling. Further, labeling failed to reveal the presence of fluorine and to give adequate warning against use by children.—*[D. D. N. J., F. D. C. 326 and 327; March 1942.]*

Radioactive Cones.—Thomas Radioactive Cone Company, Inglewood, Calif. Shipped March 20, 1940. Misbranded because of misleading labeling which failed to reveal that when used to impart radioactivity to water, the drinking of such water might result in injury to the user; further misbranded because label failed to bear name and place of business of manufacturer, packer or distributor or to give the common name of ingredient or ingredients, adequate directions for use or sufficient warnings against use by children and regarding unsafe dosage, as the product was found to be dangerous to health when used with the frequency or duration prescribed, recommended or suggested on the label.—*[D. D. N. J., F. D. C. 331; March 1942.]*

Reed's Effervescent Bromo-Sizz.—Reed Products Company, St. Louis. Shipped May 17, 1940. Composition: product contained acetanilid and would be dangerous to health when used as directed but was not labeled to show consequences that might result from its use. Further misbranded because, among other things, statement on label regarding another ingredient, "sodium bromide approx. 3%" was not correct and did not inform user as to exact amount of sodium bromide consumed when preparation was taken according to directions.—*[D. D. N. J., F. D. C. 332; March 1942.]*

Renton's Hydrocle Tablets.—Pasadena Products, Inc., Pasadena, Calif. Shipped between Aug. 31, 1938 and Jan. 3, 1939. Composition: cinchophen reported. Misbranded because dangerous to health when used for pain or fever as suggested in the labeling.—*[D. D. N. J., F. D. C. 144; April 1941.]*

Rock-A-Way Tablets.—Gates Medicine Company, Charleston, W. Va. Shipped Nov. 28, 1940. Composition: in each tablet, approximately 6 grains of boric acid, with sodium bicarbonate and citric acid. Purpose not stated. Dangerous to health if used as label recommended.—*[D. D. N. J., F. D. C. 280; November 1941.]*

Utra Jel.—Pynoad Laboratories, Inc., Chicago. Shipped Aug. 15, 1940. Composition: essentially water, soap, pine oil and combined iodine with no free iodine. Misbranded because label falsely represented the product as efficacious for "specific and nonspecific infections of the cervix and cervical canal"; because carton did not bear the common or usual names of the active ingredients and product was dangerous to health when used as recommended, namely: 1 to 5 cc. injected into cervical canal, and about 3 to 5 cc. applied on wool tampon to be left in position from 12 to 20 hours.—*[D. D. N. J., F. D. C. 333; March 1942.]*

Watkins Laxative Cold Tablets.—J. R. Watkins Company, Newark, N. J. Shipped Feb. 15, 1940. Composition: in each tablet, 1.9 grains of acetanilid, quinine, alkaloids of belladonna and extracts of plant drugs including a laxative. Misbranded because dangerous to health when used as directed on the label and because represented as a safe and appropriate remedy for such conditions as colds, headaches, sneezing and nasal discharge.—*[D. D. N. J., F. D. C. 329; March 1942.]*

Young's (Dr.) Rectal Dilators.—F. E. Young and Company, Chicago. Shipped between May 10 and June 10, 1940. Consisted of 4 hard plastic cylinders flanged at one end, slightly enlarged and pointed at the other, and varying in diameter from ½ inch to 1 inch and varying in length from 3 to 4 inches. Misbranded because represented on label to be a simple, harmless, convenient, nonhabit-forming, ideal treatment to overcome constipation and hemorrhoids permanently by inducing natural and regular bowel movement, and to improve and strengthen the body, restore the sphincter muscles to normal conditions, relieve blood congestion, establish a healthy, vigorous circulation and do many other things. Further misbranded because dangerous to health when used with the frequency and duration suggested on the label.—*[D. D. N. J., F. D. C. 335; March 1942.]*

Young's Preparation.—O. L. Brunson, Waycross, Ga. Shipped May 31, 1940. Composition: contained acetic acid and would be dangerous to health when used as label recommended for relief of itching skin and scalp.—*[D. D. N. J., F. D. C. 156; April 1941.]*

Correspondence

PULMONARY EMBOLISM FOLLOWING VARICOSE VEIN INJECTION

To the Editor:—Recent articles on pulmonary embolism following injection of varicose veins (THE JOURNAL, Aug. 2, 1941, p. 347, and April 11, 1942, p. 1293) emphasize the danger of this complication. In most cases the treatment of varicosities is elected by the patient as a preventive and is not an emergency measure. Frequent occurrence of fatal complications would justly discourage the practitioner from undertaking this method of therapy and deter the patient from submitting to it.

In the correspondence in THE JOURNAL contradictory technics are suggested. Dr. Biegeleisen (Sept. 15, 1941, p. 954) advises the use of mild initial injections. Drs. Traub and Isaac (June 20, 1942, p. 670) urge the use of large amounts of strong solutions to produce extensive damage to the intima, insisting that 1.5 cc. of sodium morrhuate 5 per cent is a small dose of a weak solution. However, in the case of Num and Harrison two injections of 2 cc. of this solution were sufficient to produce an indurated area measuring 8 by 3 cm. surrounding an 11 cm. segment of thrombosed great saphenous vein, persisting for six weeks.

I believe that the incidence of pulmonary embolism can be further reduced by preventing the filling of the "whole lumen" of the vein by a thrombus and by employing technic which will firmly anchor minimum thrombus formation and accelerate its organization and absorption.

In an article on the prevention of discomfort and disability in the treatment of varicose veins (*Am. J. Surg.* **58**:362 [Nov.] 1941) the many advantages of the empty vein technic combined with adequate support are presented. Several of the technical procedures helpful in injecting collapsed varicosities are described.

Advantages of this technic in the prevention of complications are:

1. "Whole lumen" thrombosis with accompanying disfiguring, painful, hard knots and strings, and severe inflammatory edema in the perivenous tissues are avoided. The resulting reactions are mild, causing little or no pain and discomfort; thus even the more sensitive patient will remain ambulatory during treatment. Bed rest is thought by many a factor in the production of emboli.

2. Blocking of varices is obtained by fusion of the opposing surfaces of the vessel and not by gross thrombosis. Organization and absorption of such obliterated vessels are accelerated with less chance for recanalization and loosening of blood clots.

3. Small amounts of sclerosing solution may be used, average dose 0.5 to 1.5 cc. of not too strong a solution (Sylnasol), since dilution of the irritant by blood is reduced to a minimum. Small dosage is probably a factor in avoiding allergic reactions. In many of the 44 fatal cases reviewed by Vaughn and Lees large dosage, 40 to 90 cc. of solution, was employed.

The absence of serious allergic reactions and emboli in my patients may be due to fortunate coincidence, as I am not inclined to believe that the technics referred to assure absolute safety. However, there is some reason to assume that minimum thrombus formation, its firm anchorage, its more speedy organization and absorption further reduce the incidence of pulmonary embolism.

Unfortunately the advantages of adequate support in the treatment of varicosities are often overlooked. Heyerdale and Weissman (*Proc. Staff Meet., Mayo Clin.* **82**:823 [Dec. 29] 1941) state that "only moderate pressure is necessary to collapse a superficial vein," advising the patient to remove the gauze pad at the end of two hours, "by which time it will have served its purpose," which is "temporary compression to facilitate thrombosis and to avoid escape of the contents of the vein." This technic is described as satisfactory and dependable for all types and sizes of varicosities. I insist on the continued use of effective support until after disappearance of induration and tenderness over the occluded vessels.

The following procedures may be considered additional precautionary measures for the prevention of pulmonary embolus:

1. Do not inject varicosities in the presence of edema. Eliminate the edema first by the use of effective support.

2. Do not inject varicosities in the presence of ulcerations, whether infected or clean. The use of sulfonamides locally, combined with adequate support of the superficial venous circulation, will usually control the infection and the patient may remain ambulatory. It is not necessarily advantageous to inject the varicosities, even though they are the etiologic factor. The inflammatory reaction produced, even if mild, does not accelerate healing. Moreover, effective support judiciously applied stimulates epithelization and results in a smoother and more cosmetic scar.

I. A. BRUNSTEIN, M.D., New York.

"CONSTITUTIONAL INADEQUACY"

To the Editor:—In an article on constitutional inadequacy that appeared in a recent issue of THE JOURNAL, Alvarez has crystallized certain ideas that have appeared in the medical literature from time to time. Essentially the idea put forth is that in this syndrome we are dealing with a whole body that is sick rather than with a single organ and that even if we find a diseased organ and remove it the person does not get well.

This idea represents a departure from the older doctrine of Virchow and is bound to have a great effect on medical thinking in the future. In the latter part of the last century at a conference in Rome Virchow said "We do not recognize a body that is diseased in all its parts, but for each disease we must find a seat in some organ of the body."

In 1942 Alvarez said "We must stop looking hopefully for some one lesion to explain the disability. . . . They cannot be cured, as they hope to be, by the discovery and eradication of any one local disease."

This departure represents a turning point for a clearer understanding and handling of many of the complex cases that we see in our clinics today.

S. K. ROBINSON, M.D., Chicago.

FLATULENCE

To the Editor:—May I supplement by one item the excellent paper of Dr. Alvarez on "What Causes Flatulence?" which appears in the September 5 issue.

The French have a saying "Les vents précède la pluie" (Winds precede the rain). French clinicians have taken that over into the clinical pathology of hepatic cirrhosis by saying that flatulence precedes ascites in many a case of cirrhosis of the liver with portal obstruction and consequent congestion of the intestinal wall. Many physicians will corroborate this observation. We should add hepatic cirrhosis to the list of flatugenerators.

GEORGE MANNHEIMER, M.D., New York.

Council on Medical Education and Hospitals

CONTINUATION COURSES FOR PRACTICING PHYSICIANS

In accordance with the plan of the Council on Medical Education and Hospitals, advance information concerning continuation courses for practicing physicians available in the various centers is published quarterly. The following list consists of courses beginning during the period Oct. 15, 1942-Jan. 15, 1943. It is hoped that this material will be useful to physicians seeking opportunities for postgraduate work. Physicians called on to assume new responsibilities because of the war and physicians who are returning to practice may find here listed courses which will be of help to them. Since many of the classes are necessarily limited, those who contemplate enroling in any of these courses are urged to communicate as early as possible with the proper executive officer.

H. G. Weiskotten, M.D.,
Secretary, Council on Medical
Education and Hospitals.

Continuation Courses for Practicing Physicians, October 15, 1942-January 15, 1943

Institution	Schedule of Course	Title of Course	Number of Students Accepted	Registration Fee and/or Tuition
ALLERGY—See also Dermatology & Syphilology, Medicine				
Tufts Medical School, 30 Bennet Street, Boston, Mass. Write to: Dr. Samuel Proger, Chairman, Postgraduate Division	Oct. 19-23. Full time	Diagnosis and Treatment of Allergic Conditions	Minimum: 6	$25[1]
Columbia University, Faculty of Medicine, at the New York Postgraduate Medical School, 303 East 20th Street, New York, N. Y. Write to: Director of the School	Nov. 30-Dec. 18.[2] Full time	Allergy	4-8	$150[3]
University of Pennsylvania Graduate School of Medicine, 237 Medical Laboratories, Philadelphia, Pa. Write to: Dr. R. C. Boerkl, Dean, The Medico-Chirurgical College	Arranged. 4 weeks, part time	Allergy	Individuals[4]	$130
ANATOMY—See also Obstetrics & Gynecology, Ophthalmology, Otolaryngology, Psychiatry & Neurology, Surgery				
New York Medical College, Flower and 5th Avenue Hospitals, 5th Avenue at 106th Street, New York, N. Y. Write to: Dr. J. A. W. Hetrick, Dean	Arranged, 60 hours	Applied Anatomy of the Urogenital System	....	$150 [5]
	Arranged. 100 hours	Surgical Anatomy [6]	....	$250
	Arranged. 60 hours	Applied Anatomy of Ear, Nose and Throat	....	$150[5]
	Arranged. 90 hours	Applied Anatomy of Pelvis and Abdomen	....	$230
ANESTHESIOLOGY				
Harvard University Medical School, 25 Shattuck Street, Boston, Mass. Write to: Dr. Frank R. Ober, Ass't Dean, Courses for Graduates	Monthly. Days and hours arranged	Clinical Anesthesia	3	$30
Tufts Medical School, 30 Bennet Street, Boston, Mass. Write to: Dr. Samuel Proger, Chairman, Postgraduate Division	Nov. 30-Dec. 3. Full time	Theory and Practice of Modern Anesthetic Technic	4-10	$25[1]
Long Island College of Medicine. Write to: Dr. Simon R. Blatteis, Chairman, Joint Committee on Post-Graduate Education, 1313 Bedford Avenue, Brooklyn, N. Y.	Arranged in October. 32 sessions	Regional Anesthesia	....	$75
Columbia University, Faculty of Medicine, at the New York Postgraduate Medical School, 303 East 20th Street, New York, N. Y. Write to: Director of the School	Continuously. Full time, 2 weeks	Anesthesia	1[4]	$50[3]
	Arranged. 12 sessions	Regional Anesthesia	2-4[4]	$75[3]
Columbia University, Faculty of Medicine, 630 West 168th Street, New York, N. Y., at Mount Sinai Hospital. Write to: Dean	Oct. 26-Dec. 3.[2] Part time	Regional Nerve Block	Limited[4]	$30
New York Polyclinic Medical School and Hospital, 345 West 50th Street, New York, N. Y. Write to: Dr. F. H. Dillingham, Executive Officer	Jan. 2. 3 months, full time	Regional and Spinal Anesthesia	4	$300[3]
New York University College of Medicine, 477 First Avenue, New York, N. Y. Write to: Dr. John H. Mulholland, Asst. Dean	Arranged. 3 weeks, part time	Inhalation Anesthesia	5	$150
	Arranged. 3 weeks part time	Regional Anesthesia	....	$200
BACTERIOLOGY—See also Ophthalmology, Otolaryngology, Pathology				
Columbia University, Faculty of Medicine, at the New York Postgraduate Medical School, 303 East 20th Street, New York, N. Y. Write to: Director of the School	January.[2] 1 month, part time	Clinical Bacteriology and Serology	3-8	$50[3]
	November.[2] 1 month, full time	Practical Technique of Medical Bacteriology	2	$100[3]
BIOCHEMISTRY				
Harvard University Medical School, 25 Shattuck Street, Boston, Mass. Write to: Dr. Frank R. Ober, Ass't Dean, Courses for Graduates	Arranged	Research in Biological Chemistry	....	Arranged [1]
BRONCHOSCOPY—See Otolaryngology				
CARDIOLOGY				
California Heart Association. Write to: San Francisco Heart Committee, 277 Pine Street, San Francisco, Calif.	Nov. 5-7. Full time	Annual Postgraduate Symposium in Cardiovascular Disease	....	$15 [7,8]
Los Angeles Heart Association, 122 East 7th Street, Los Angeles, Calif. Write to: Secretary	Nov. 12-13. Full time	Annual Postgraduate Symposium in Cardiovascular Disease	....	$5 [7,8]
Tufts Medical School, 30 Bennet Street, Boston, Mass. Write to: Dr. Samuel Proger, Chairman, Postgraduate Division	Nov. 16-21. Full time	Practical Application of Present-Day Knowledge of Heart Disease	....	$25 [1]
University of Michigan, University Hospital, Ann Arbor, Mich. Write to: Department of Postgraduate Medicine	Nov. 16-21	Electrocardiographic Diagnosis	Limited	$25
Long Island College of Medicine. Write to: Dr. Simon R. Blatteis, Chairman, Joint Committee on Post-Graduate Education, 1313 Bedford Avenue, Brooklyn, N. Y.	Oct. 20. 5 weeks, part time	Electrocardiography and Clinical Cardiology	....	$20
Columbia University, Faculty of Medicine, at the New York Postgraduate Medical School, 303 East 20th Street, New York, N. Y. Write to: Director of the School	Nov. 5-Dec. 1.[2] Part time	Advanced Electrocardiography	Minimum: 3	$50[3]
Columbia University, Faculty of Medicine, 630 West 168th Street, New York, N. Y., at Mount Sinai Hospital. Write to: Dean	Oct. 26-Dec. 18.[2] Part time	Clinical Aspects of Heart Diseases in Adults	6-12	$30
New York Medical College, Flower and 5th Avenue Hospitals, 5th Avenue at 106th Street, New York, N. Y. Write to: Dr. J. A. W. Hetrick, Dean	Arranged. 16 semiweekly sessions	Cardiology and Electrocardiography	....	$100
New York State Department of Health, Cardiac Service, at the New York State Reconstruction Home, West Haverstraw, N. Y. Write to: Reconstruction Home	Arranged. 3 months	Rheumatic Cardiac Disease	Limited [9]	None [10]
University of Pennsylvania Graduate School of Medicine, 237 Medical Laboratories, Philadelphia, Pa. Write to: Dr. R. C. Boerkl, Dean, The Medico-Chirurgical College	Weekly. 5 days, part time	Electrocardiology and Cardiac Roentgenology	Individuals [4]	$60
CYSTOSCOPY—See Obstetrics & Gynecology, Urology				

References will be found on p. 560

Continuation Courses for Practicing Physicians, October 15, 1942-January 15, 1943—Continued

Institution	Schedule of Course	Title of Course	Number of Students Accepted	Registration Fee and/or Tuition
DERMATOLOGY & SYPHILOLOGY—See also Venereal Disease Control				
Harvard University Medical School, 25 Shattuck Street, Boston, Mass. Write to: Dr. Frank R. Ober, Ass't Dean, Courses for Graduates	Arranged. 2 months, part time	Clinical Mycology	6	$50
	Monthly. 1 month, part time	Dermatology	....	$40
	Arranged. Full time	Dermatology. Elective (on approval): Skin Ward Work	Limited [11]	Arranged
	January. 1 year, full time	Dermatology and Syphilology	Limited [11,12]	$300
Tufts Medical School, 30 Bennet Street, Boston, Mass. Write to: Dr. Samuel Proger, Chairman, Postgraduate Division	Jan. 18-23. Full time	Diagnosis and Therapy of the Commoner Diseases of the Skin (Dermatology B)	Minimum: 6	$25 [1]
Columbia University, Faculty of Medicine, at the New York Postgraduate Medical School, 303 East 20th Street, New York, N. Y. Write to: Director of the School	Arranged. 6 weeks or 3 months, part time	Diagnosis and Treatment of Syphilis	6	$25, $40 [3]
	Arranged. 6 weeks or 3 months, part time	Clinical Dermatology and Syphilology	20	$40, $75 [3]
	Arranged. 6 weeks or 3 months, part time	Practical Instruction in Dermatological Allergy and Immunology	3 [4]	$40, $75 [3]
	Arranged. 6 weeks or 3 months, part time	Practical Instruction in Diagnosis and Management of Syphilis	3	$40, $75 [3]
	Arranged. 6 weeks or 3 months, part time	Practical Instruction in Minor Dermatological Surgery	2 [4]	$40, $75 [3]
	Arranged. 6 weeks or 3 months, part time	Practical Instruction in Mycology and Animal Parasitology as Related to Diseases of the Skin	3 [4]	$40, $75 [3]
	Arranged. 3 months, 6 months or 1 year, part time	Practical Instruction in the Pathological Histology of Diseases of the Skin	12 [4]	$75, $125, $175 [3]
	Arranged. 6 weeks or 3 months, part time	Practical Instruction in Physical Therapy as Applied to Diseases of the Skin	3	$40, $75 [3]
Columbia University, Faculty of Medicine, 630 West 168th Street, New York, N. Y., at Mount Sinai Hospital. Write to: Dean	Oct. 27, 1942-Jan. 16, 1943. [2] Part time	Clinical Dermatology and Syphilis	Minimum: 4	$50
ELECTROCARDIOGRAPHY—See Cardiology				
ENDOCRINOLOGY—See also Medicine, Obstetrics & Gynecology				
Tufts Medical School, 30 Bennet Street, Boston, Mass. Write to: Dr. Samuel Proger, Chairman, Postgraduate Division	Nov. 9-13. Full time	Recent Advances in Endocrinology	....	$25 [1]
ENDOSCOPY—See Obstetrics & Gynecology, Ophthalmology, Otolaryngology, Surgery, Urology				
EPIDEMIOLOGY—See Military Medicine				
FORENSIC MEDICINE				
New York University College of Medicine, 477 First Avenue, New York, N. Y. Write to: Dr. John H. Mulholland, Ass't Dean	Arranged, Oct.-May. 1 to 7 months, part time	Forensic Medicine	....	$25-$100
GASTROENTEROLOGY—See also Proctology, Surgery				
Columbia University, Faculty of Medicine, 630 West 168th Street, New York, N. Y., at Mount Sinai Hospital. Write to: Dean	Oct. 26-Dec. 18. [2] Part time	Diagnosis and Treatment of Diseases Affecting the Gastrointestinal Tract	4-8	$75
Columbia University, Faculty of Medicine, 630 West 168th Street, New York, N. Y., at Presbyterian Hospital. Write to: Dean	Arranged. 2 months, part time	Gastroscopy	1 [4]	$200
New York Medical College, Flower and 5th Avenue Hospitals, 5th Avenue at 105th Street, New York, N. Y. Write to: Dr. J. A. W. Hetrick, Dean	Arranged. Part time	Gastroscopy	....	$100 [13]
	Arranged. Part time	Peritoneoscopy	....	$50 [13]
New York Polyclinic Medical School and Hospital, 345 West 50th Street, New York, N. Y. Write to: Dr. F. H. Dillingham, Executive Officer	Jan. 2. 6 weeks, part time	Clinical Gastroenterology	10	$50 [3]
Hahnemann Medical College and Hospital, 230 North Broad Street, Philadelphia, Pa. Write to: Dr. William A. Pearson, Dean	Monthly. 1 month, full time	Postgraduate Gastroscopy	2 per mo.	$100
University of Pennsylvania Graduate School of Medicine, 237 Medical Laboratories, Philadelphia, Pa. Write to: Dr. R. C. Buerki, Dean, The Medico-Chirurgical College	Arranged. 16 weeks, part time	Clinical Course	Individuals [4]	$400
Medical Society of Milwaukee County. Write to: Mr. J. O. Kelley, Executive Secretary, 203 East Wisconsin Avenue, Milwaukee, Wis.	Nov. 2-4. Full time	Functional and Inflammatory Disorders and Neoplasm of the Gastrointestinal Tract	....	$3
GASTROSCOPY—See Gastroenterology				
GYNECOLOGY—See Obstetrics & Gynecology				
HEMATOLOGY—See also Pathology, Surgery				
Tufts Medical School, 30 Bennet Street, Boston, Mass. Write to: Dr. Samuel Proger, Chairman, Postgraduate Division	Nov. 16-21. Full time	Hematology A	....	$25 [1]
Columbia University, Faculty of Medicine, 630 West 168th Street, New York, N. Y., at Mount Sinai Hospital. Write to: Dean	Oct. 26-Dec. 17. [2] Part time	Clinical Elementary Course	6	$50
New York Medical College, Flower and 5th Avenue Hospitals, 5th Avenue at 105th Street, New York, N. Y. Write to: Dr. J. A. W. Hetrick, Dean	Arranged. Part time	Physical Diagnosis and hematology	....	$100
LARYNGOLOGY—See Otolaryngology				
MEDICINE				
College of Medical Evangelists, Inc., 312 North Boyle Avenue, Los Angeles, Calif. Write to: Dr. G. Mosser Taylor, Chairman, Committee on Postgraduate Education	Dec. 7-11. Full time	Postgraduate Week	....	Not stated
Florida Medical Association, Inc. Write to: Dr. T. Z. Cason, Chairman, Medical Postgraduate Course, 2833 Riverside Avenue, Jacksonville, Fla.	Arranged. 2 weeks or more, full time	General Medicine	10	$5
Maine Medical Association, 142 High Street, Portland, Maine. Write to: Dr. Frederick R. Carter, Chairman, Committee on Graduate Education	Arranged. Part time	Home Study Course	Limited [14]	None
University of Maryland, School of Medicine, Lombard and Green Streets, Baltimore, Md. Write to: Dr. H. Boyd Wylie, Acting Dean	Arranged	Subject optional	Individuals	Arranged
Harvard University Medical School, 25 Shattuck Street, Boston, Mass. Write to: Dr. Frank R. Ober, Ass't Dean, Courses for Graduates	Continuously. Part time	Diabetes	....	None

References will be found on p. 560

Continuation Courses for Practicing Physicians, October 15, 1942-January 15, 1943—Continued

Institution	Schedule of Course	Title of Course	Number of Students Accepted	Registration Fee and/or Tuition
MEDICINE—Continued				
University of Michigan Department of Postgraduate Medicine, University Hospital, Ann Arbor, Mich. Write to: Department of Postgraduate Medicine	Nov. 2-5. Full time	Nutritional and Endocrine Problems	Limited	$10
Omaha Mid-West Clinical Society, 1026 Medical Arts Building, Omaha, Neb. Write to: Dr. J. D. McCarthy, Secretary-Director of Clinics	Oct. 26-30. Full time	Annual Clinical Assembly.....	....	$5 [7]
Long Island College of Medicine, 350 Henry Street, Brooklyn, N. Y. Write to: Alfred Crawford, Ass't to the Dean	Nov. 2-13. Full time	Industrial Medicine	50	$50
	time			
	Nov. 30-Dec. 4.[2] Full time	Diabetes Mellitus, Nephritis and Hypertension	Minimum: 4	$25 [3]
Columbia University, Faculty of Medicine, at the New York Postgraduate Medical School, 303 East 20th Street, New York N. Y. Write to: Director of the School	Nov. 30-Dec. 4.[2] Full time	Metabolism, Including Endocrinology and Nutrition	Minimum: 4	$25 [3]
	Dec. 7-11.[2] Full time	Peripheral Vascular Diseases...	4-10	$25 [3]
	Jan. 4.[2] 1 or 2 months, full time	Seminar in Internal Medicine..	4-10	$125, $200 [3]
	Oct. 26-Dec.18.[2] Part time	Allergy in Relation to Internal Medicine	....	$75
Columbia University, Faculty of Medicine, 630 West 168th Street, New York, N. Y., at Mount Sinai Hospital. Write to: Dean	Oct. 26, 1942-Jan. 4, 1943.[2] Part time	Diagnosis and Therapy.....	Minimum: 6	$50
	Oct. 28, 1942-Jan. 6, 1943.[2] Part time	Diseases of the Liver and Biliary Passages	5-10	$40
	Oct. 26-Dec. 18.[2] Part time	General Bedside Therapy.....	10	$25
Columbia University, Faculty of Medicine, 630 West 168th Street, New York, N. Y., at Bellevue and Presbyterian Hospitals. Write to: Dean	Oct. 26-Nov. 7.[2] Part time	Physiology and Therapy of Diseases of the Chest	....	$50
New York Medical College, Flower and 5th Avenue Hospitals, 5th Avenue at 105th Street, New York, N. Y. Write to: Dr. J. A. W. Heinrich, Dean	Arranged. Part time	Endocrine and Metabolic Disturbances, Including Diabetes Mellitus	....	$100
New York Polyclinic Medical School and Hospital, 335 West 50th Street, New York, N. Y. Write to: Dr. F. H. Dillingham, Executive Officer	Arranged. 6 weeks or 3 months. Full time	Course for General Practitioners	....	$100, $150 [3]
Oklahoma City Clinical Society, 512 Medical Arts Building, Oklahoma City, Okla. Write to: Secretary	Oct. 26-29. Full time	Annual Conference	....	$10
University of Pennsylvania Graduate School of Medicine, 237 Medical Laboratories, Philadelphia, Pa. Write to: Dr. R. C. Buerki, Dean, The Medico-Chirurgical College	Arranged. 2-4 weeks, part time	Diabetes Mellitus .....Individuals [4]		$150
Post Graduate Medical Assembly of South Texas. Write to: Dr. Judson L. Taylor, Program Chairman, 20 Courtland Place, Houston, Tex.	Dec. 1-3. Full time	Eleventh Annual Meeting.....	....	$10 [15]
MILITARY MEDICINE				
Harvard University Medical School, 25 Shattuck Street, Boston, Mass. Write to: Dr. Frank R. Ober, Ass't Dean, Courses for Graduates	To be announced. 2 weeks, full time	Military Medicine and Surgery.	Limited [16]	Not stated
Inter-State Postgraduate Medical Association, at the Palmer House, Chicago. Write to: Arthur G. Sullivan, M.D., Managing Director, 16 North Carroll Street, Madison, Wis.	Oct. 26-30. Full time	War and Civilian Practice Subjects	....	$5
Navy Department, Washington, D. C. Write to: Bureau of Medicine and Surgery	Arranged. 8 weeks, full time	Aviation Medicine (Aviation Medical Examiner)	Limited [17]	None
	Arranged. 3 months, full time	Aviation Medicine (Flight Surgeon)	Limited [17]	None
	Arranged, 8 weeks, full time	Basic Instruction	Limited [17]	None
	Arranged. 6 months, full time	Deep Diving	4-12 [17]	None
	Arranged. 6 months, full time	Epidemiology	8-20 [17]	None
	Monthly. Full time	Basic Course for Officers.....	200 [17]	None
	Monthly. 1 month, full time	Exemplary Course	150 [17]	None
	Monthly. 1 month, full time	Maxillo-Facial and Plastic Surgery	12 [17]	None
	Arranged. 1-3 months, full time	Officer Pool, 14 General Hospitals	700 [17]	None
	Undetermined	Officer Pool, Gulf Coast Air Corps Training Center	200 [17]	None
	Indefinite	Officer Pool, Medical Field Service School	150 [17]	None
Write to: Training Division, Office of The Surgeon General, War Department, Washington, D. C.	Arranged. 1-3 months	Officer Pool, Medical Replacement Training Centers	200 [17]	None
	Undetermined	Officer Pool, Medical Supply Depots and Medical Sections, General Depots	30 [17]	None
	Arranged. 2 weeks, full time	Photoroentgenology	20 [17]	None
	Monthly. Full time	Special Course for Division Officers	100 [18]	None
	Continuous	Specialized Surgical Team Training	Limited [17]	None
NEUROLOGY—See Psychiatry & Neurology				
OBSTETRICS & GYNECOLOGY—See also Pathology				
Florida Medical Association, Inc. Write to: Dr. T. Z. Cason, Chairman, Medical Postgraduate Course, 2033 Riverside Avenue, Jacksonville, Fla.	Continuously. 2 weeks or more. Full time	Gynecology	5	$5
	Continuously. 2 weeks or more. Full time	Obstetrics	5	$5
The Chicago Maternity Center. Write to: Dr. Beatrice L. Tucker, Medical Director, 1336 South Newberry Avenue, Chicago, Ill.	January. 4 months	Practical Obstetrics	....	$10
University of Illinois College of Medicine, 1853 West Polk Street, Chicago, Ill. Write to: Mr. George Moon, Ass't to the Dean	Arranged. 2 weeks, full time	Obstetrics and Pediatrics.....	Limited	None
Indiana University Medical Center, 1040-1232 West Michigan Street, Indianapolis, Ind. Write to: Dr. C. J. Clark, Chairman, Department of Postgraduate Instruction	Arranged. 2 weeks, full time	Obstetrics	10	$10 [19]
Maine Medical Association, 142 High Street, Portland, Maine. Write to: Dr. Frederick R. Carter, Chairman, Committee on Graduate Education	Arranged	Home Study Course.....	Limited [16]	None

References will be found on p. 560

Continuation Courses for Practicing Physicians, October 15, 1942-January 15, 1943—Continued

Institution	Schedule of Course	Title of Course	Number of Students Accepted	Registration Fee and/or Tuition
OBSTETRICS & GYNECOLOGY—See also Pathology—Continued				
Harvard University Medical School, 25 Shattuck Street, Boston, Mass. Write to: Dr. Frank R. Ober, Ass't Dean, Courses for Graduates	Monthly. 1 month or more, full time	Clinical Obstetrics	6 [39]	$125
	Monthly. Part time	Gonorrhea in Women	3	$20
	Arranged. 5 weeks, part time	Cystoscopy and Endoscopy	6	$75 [3]
	Arranged. 3 or 5 weeks, part time	Diagnosis and Office Treatment of Gynecology	6	$40, $60 [3]
	Arranged. 8 weeks, part time	Gynecological Endocrinology	4	$100 [3]
Columbia University, Faculty of Medicine, at the New York Postgraduate Medical School, 308 East 20th Street, New York, N. Y. Write to: Director of the School	Arranged. 4 weeks or more, part time	Gynecological Pathology	....	Arranged
	Jan. 4 [2], 2 or 3 months	Seminar in Gynecology	4-6	$125, $225, $300 [3]
	Arranged. 4 weeks, part time	Surgical Anatomy as Applied to Operative Gynecology (Cadaver)	2-3 [4]	$200 [3]
Columbia University, Faculty of Medicine, 630 West 168th Street, New York, N. Y., at Mount Sinai Hospital. Write to: Dean	Oct. 26-Dec. 19. [2] Full time	Gynecological Diagnosis, Treatment and Pathology	6-12	$75
	Jan. 4-29. [2] Part time	Gynecological Endocrinology	....	$50
Columbia University, Faculty of Medicine, 630 West 168th Street, New York, N. Y., at Margaret Hague Maternity Hospital. Write to: Dean	January. 3 months	Internship Training	....	$350
	Monthly. 1 month	Observation Course, Obstetrics	....	$100
New York Polyclinic Medical School and Hospital, 345 West 50th Street, New York, N. Y. Write to: Dr. F. H. Dillingham, Executive Officer	Nov. 1. 2 months, full time	Clinical and Operative Obstetrics and Gynecology	6	$250 [3]
Duke University School of Medicine, at Duke Hospital. [32] Write to: Dr. G. M. Cooper, Director, Maternal and Child Health Service, North Carolina State Board of Health, Raleigh, N. C.	Weekly. 5 days, full time	Obstetrics and Pediatrics	4-6 [31]	None [33]
OPHTHALMOLOGY—See also Otolaryngology, Radiology				
Children's Memorial Hospital, 707 Fullerton Avenue, Chicago, Ill. Write to: Miss Meyer, Secretary	Nov. 8-13. 6 days, full time	Neuro-Muscular Anomalies of the Eye	Limited	$50
University of Illinois College of Medicine, 1853 West Polk Street, Chicago, Ill. Write to: Mr. George Moon, Ass't to the Dean	Jan. 1. 9 months, part time	Ophthalmology	Limited [34]	$150
Tufts Medical School, 30 Bennet Street, Boston, Mass. Write to: Dr. Samuel Proger, Chairman, Postgraduate Division	Monthly. 1 month, part time	External Eye Diseases	....	$50 [3]
	Oct. 26-31. [2] Full time	Advanced Course in Anomalies of the Ocular Muscles	8-12 [4]	$50 [3]
Columbia University, Faculty of Medicine, at the New York Postgraduate Medical School, 308 East 20th Street, New York, N. Y. Write to: Director of the School	Arranged. Part time [35]	Embryology, Histology and Pathology of the Eye	Limited [4]	$75 [3]
	Oct. 19-24. [2] Full time	Motor Anomalies of the Eye	10-25 [4]	$30 [3]
	Nov. 2-7. [2] Part time	Slit Lamp Diagnosis	4-8 [4]	$35 [3]
	Nov. 2-6. [2] Part time	Surgical Anatomy as Applied to Operative Surgery of the Eye	4-8 [4]	$40 [3]
Columbia University, Faculty of Medicine, 630 West 168th Street, New York, N. Y., at Mount Sinai Hospital. Write to: Dean	Oct. 26-Dec. 17. Part time	Ophthalmic Surgery	4 [4]	$100
	Oct. 26-Dec. 3. [2] Part time	Ophthalmoscopy	4-6	$20
New York Eye and Ear Infirmary, 218 Second Avenue, New York, N. Y. Write to: Mabel B. Stewart, Registrar	Monthly. [2] 1 month, part time	Anomalies of the Ocular Muscles	8 [3]	$40 [33]
	Monthly. [2] 1 month, part time	Bacteriology of the Eye	4 [3]	$40 [33]
	Monthly. [2] 1 month, part time	External Diseases of the Eye	6 [3]	$40 [33]
	Monthly. [2] 1 month part time	Ocular Therapy	6 [3]	$40 [33]
	Monthly. [2] 1 month, or more, part time	Operative Surgery of the Eye	4 [4]	$75 [33]
	Jan. 1. [2] 6 months, full time	Ophthalmology and Otology	Limited [3]	$600
	Monthly. [2] 1 month, part time	Ophthalmoscopy	4 [3]	$40 [33]
	Monthly. [2] 1 month, part time	Perimetry	6 [3]	$40 [33]
	Monthly. [2] 3 months, part time	Physiological Optics	8 [3]	$75 [33]
	Monthly. [2] 3 months part time	Refraction	8 [3]	$100 [33]
	Monthly. [2] 1 month, part time	Slit Lamp Course	6 [3]	$50 [33]
New York Polyclinic Medical School and Hospital, 345 West 50th Street, New York, N. Y. Write to: Dr. F. H. Dillingham, Executive Officer	Jan. 2.6 weeks part time	Clinical Eye Course	10	$50 [3]
	Jan. 2. 3 months part time	Operative Course (Cadaver)	10	$275 [3]
University of Pennsylvania Graduate School of Medicine, 237 Medical Laboratories, Philadelphia, Pa. Write to: Dr. H. C. Buerki, Dean, The Medico-Chirurgical College	Arranged. 8 weeks, part time	Ocular Refraction	Individuals [4]	$270
	Arranged. 8 weeks, part time	Ophthalmic Histology and Pathology	Individuals [4]	$200
	Arranged. 3 weeks, part time	Ophthalmic Operations (Cadaver)	Individuals [4]	$270
ORTHOPEDICS—See also Surgery				
Columbia University, Faculty of Medicine, 630 West 168th Street, New York, N. Y., at Mount Sinai Hospital. Write to: Dean	Oct. 26-Dec. 17. [2] Part time	Practical Course in Injuries and Diseases of the Bones and Joints	4-12	$25
	Oct. 26-Dec. 17. [2] Part time	Practical Demonstration of Present-Day Methods of Treating Fractures	4-8 [4]	$35
OTOLARYNGOLOGY—See also Anatomy, Ophthalmology, Radiology				
University of Illinois College of Medicine, 1853 West Polk Street, Chicago, Ill. Write to: Mr. George Moon, Ass't to the Dean	Jan. 1. 9 months, full time	Otolaryngology	Limited [34]	$200

References will be found on p. 560

Continuation Courses for Practicing Physicians, October 15, 1942-January 15, 1943—Continued

Institution	Schedule of Course	Title of Course	Number of Students Accepted	Registration Fee and/or Tuition
OTOLARYNGOLOGY—See also Anatomy, Ophthalmology, Radiology—Continued				
	Arranged. 2 weeks, full time	Bronchoscopy and Esophagoscopy	Limited [11]	$150
Harvard University Medical School, 25 Shattuck Street, Boston, Mass. Write to: Dr. Frank R. Ober, Asst Dean, Courses for Graduates	Monthly. 1 month, full time	Clinical Otology	2 [11]	$50
	Arranged. 2 weeks, full time	Physiology of the Cochlea and Vestibular Apparatus	2	$50
	Arranged	Technique of Submucous Resection of the Nasal Septum	Limited	$75
Tufts Medical School, 30 Bennet Street, Boston, Mass. Write to: Dr. Samuel Proger, Chairman, Postgraduate Division	Monthly. 1 month, part time	Otolaryngology	....	$50, $50 [1]
	Arranged. 4 weeks or more, part time	Diagnostic Procedures in Otolaryngology	6	$30 [9]
	Arranged	Dissection of the Head and Neck	Minimum: 2 [4]	Arranged [9]
Columbia University, Faculty of Medicine, at the New York Postgraduate Medical School, 303 East 20th Street, New York, N. Y. Write to: Director of the School	Arranged. 15 sessions [24]	Embryology, Histology and Pathology of the Ear, Nose and Throat	Limited [4]	$75 [9]
	Arranged	Surgical Anatomy as Applied to Otology (Cadaver)	2-6 [4]	Arranged [9]
	Arranged	Surgical Anatomy as Applied to Rhinology and Laryngology (Cadaver)	2-6 [4]	Arranged [9]
Columbia University, Faculty of Medicine, 630 West 168th Street, New York, N. Y., at Presbyterian Hospital. Write to: Dean	Arranged, Oct.-April, 3 weeks	Instruments and Technique of Bronchoscopy	Limited [4]	$250
	Monthly. [2] 4 weeks, part time	Anatomy of the Ear	4 [9]	$45 [25]
	Monthly. [2] 1 month or more, part time	Bacteriology of the Ear	4 [9]	$40 [25]
New York Eye and Ear Infirmary, 218 Second Avenue, New York, N. Y. Write to: Mabel R. Stewart, Registrar	Monthly, Oct.-May. [2] 2 or 6 weeks, full or part time	Broncho-Esophagology	4 [9]	$250 [25]
	Monthly. [2] 1 month, part time	Clinical Otology	4 [9]	$40 [25]
	Monthly. [2] 1 month, part time	Operative Surgery of the Ear and Nasal Accessory Sinuses (Cadaver)	4 [9]	$110 [25]
	Jan. 2. 6 weeks, part time	Clinical Ear, Nose and Throat Course	10	$75 [9]
New York Polyclinic Medical School and Hospital, 345 West 50th Street, New York, N. Y. Write to: Dr. F. H. Dillingham, Executive Officer	Jan. 2. 6 weeks, full time	Clinical Eye, Ear, Nose and Throat Course	10	$100 [9]
	Jan. 2. 3 months, full time	Combined Eye, Ear, Nose and Throat Course	10	$200 [9]
University of Pennsylvania Graduate School of Medicine, 227 Medical Laboratories, Philadelphia, Pa. Write to: Dr. R. C. Buerki, Dean, The Medico-Chirurgical College	Arranged. 2 weeks, part time	Otologic Operations (Cadaver)	Individuals [4]	$250
	Arranged. 10 days, part time	Rhinolaryngologic Operations (Cadaver)	Individuals [4]	$150
PATHOLOGY—See also Dermatology & Syphilology, Obstetrics & Gynecology, Ophthalmology, Otolaryngology, Psychiatry & Neurology				
Harvard University Medical School, 25 Shattuck Street, Boston, Mass. Write to: Dr. Frank R. Ober, Asst Dean, Courses for Graduates	Monthly	Pathology [27]	4	$40
	Monthly. 1 month, full time	Pathology of Obstetrics and Gynecology [27]	2 [4]	$125
	Arranged	Research in Pathology	....	Arranged [1,10]
Columbia University, Faculty of Medicine, at the New York Postgraduate Medical School, 303 East 20th Street, New York, N. Y. Write to: Director of the School	Nov. 2-27. [2] Part time	Pathology of the Blood and Blood-Forming Organs	3-6 [4]	$75 [9]
New York Polyclinic Medical School and Hospital, 345 West 50th Street, New York, N. Y. Write to: Dr. F. H. Dillingham, Executive Officer	Arranged	Pathology and Bacteriology (Practical Laboratory Instruction)	....	Arranged [9]
PEDIATRICS—See also Obstetrics & Gynecology				
Florida Medical Association, Inc. Write to: Dr. T. E. Cason, Chairman, Medical Postgraduate Course, 2033 Riverside Avenue, Jacksonville, Fla.	Arranged. 2 weeks or more, full time	Pediatrics	5	$5
Maine Medical Association, 142 High Street, Portland, Maine. Write to: Dr. Frederick B. Carter, Chairman, Committee on Graduate Education	Arranged	Home Study Course	Limited [14]	None
Harvard University Medical School, 25 Shattuck Street, Boston, Mass. Write to: Dr. Frank R. Ober, Asst Dean, Courses for Graduates	Jan. 1. 1 year, full time	Pediatrics	Limited [4,13]	$300
Tufts Medical School, 30 Bennet Street, Boston, Mass. Write to Dr. Samuel Proger, Chairman, Postgraduate Division	Jan. 4-30. Full time	Pediatrics	4	$50 [1]
	January. 4 weeks, part time	Clinical Pediatrics	3-9	$40 [9]
Columbia University, Faculty of Medicine, at the New York Postgraduate Medical School, 303 East 20th Street, New York, N. Y. Write to: Director of the School	November. 1 month, full time	Clinical Pediatrics	3-5	$100 [9]
	Jan. 4. [2] 4 weeks, full time	Seminar in Pediatrics	3-12	$125 [9]
Columbia University, Faculty of Medicine, 630 West 168th Street, New York, N. Y., at Mount Sinai Hospital. Write to Dean	Oct. 27-Dec. 17. [2] Part time	Clinical Pediatrics: A Comprehensive Course in Diseases of Children	....	$30
PERITONEOSCOPY—See Gastroenterology				
PHYSIOLOGY—See also Otolaryngology, Psychiatry & Neurology				
Harvard University Medical School, 25 Shattuck Street, Boston, Mass. Write to: Dr. Frank R. Ober, Asst Dean, Courses for Graduates	Arranged	Research in Physiology	....	Arranged [1]
PHYSIOTHERAPY—See also Dermatology & Syphilology				
Columbia University, Faculty of Medicine, 630 West 168th Street, New York, N. Y., at Mount Sinai Hospital. Write to Dean	Oct. 27-Dec. 17. [2] Part time	Physical Therapy for the General Practitioner	6-15	$35
New York Polyclinic Medical School and Hospital, 345 West 50th Street, New York, N. Y. Write to: Dr. F. H. Dillingham, Executive Officer	Jan. 2. 4 weeks, part time	General Course	6	$100 [9]
PROCTOLOGY—See also Surgery				
Tufts Medical School, 30 Bennet Street, Boston, Mass. Write to Dr. Samuel Proger, Chairman, Postgraduate Division	Oct. 26-31. Full time	Proctology I	....	$25 [1]
	Nov. 9-28. Part time	Proctology II	2 [9]	$100 [1]
Long Island College of Medicine. Write to: Dr. Simon R. Blatteis, Chairman, Joint Committee on Post-Graduate Education, 1313 Bedford Avenue, Brooklyn, N. Y.	Oct. 19. 3 weeks, part time	Proctology	6	$35

References will be found on p. 560

Continuation Courses for Practicing Physicians, October 15, 1942-January 15, 1943—Continued

Institution	Schedule of Course	Title of Course	Number of Students Accepted	Registration Fee and/or Tuition
PROCTOLOGY—See also Surgery—Continued				
New York Polyclinic Medical School and Hospital, 345 West 50th Street, New York, N. Y. Write to: Dr. F. H. Dillingham, Executive Officer	Jan. 2. 6 weeks, part time	Clinical Proctology, Medical and Operative	10	$75 [3]
	Jan. 2. 6 or 12 weeks, full time	Combined Course in Proctology, Gastroenterology and Allied Subjects	10	$200 [3]
	Jan. 2. Part time	Operative Proctology (Cadaver)	10	$200 [3]
PSYCHIATRY & NEUROLOGY—See also Surgery				
Institute for Psychoanalysis, 45 East Ohio Street, Chicago, Ill. Write to: Helen Ross, Administrative Director	Arranged. 2 weeks, part time	Clinical Discussions of War Neuroses	50	None
The Menninger Clinic, Topeka, Kan. Write to: Dr. Karl Menninger, Chief of Staff	Quarterly. 1 year, full time	Psychoanalytic Instruction ...	4 [24]	None
	Quarterly. 1 year, full time	Resident Training	4 [24]	None
	Arranged. Full time	Short Courses	....	$100 per mo.
Harvard University Medical School, 25 Shattuck Street, Boston, Mass. Write to: Dr. Frank R. Ober, Asst Dean, Courses for Graduates	Arranged	Neuroanatomy, Neurophysiology, Neuropathology, Clinical Neurology or Neurosurgery [29]	....	Arranged
	Arranged	Psychiatry: General Course or Special Fields	Individuals	rranged
	Arranged	Research in Neuropathology. Elective: Research on the Cerebrospinal Fluid	....	Arranged
Columbia University, Faculty of Medicine, 630 West 168th Street, New York, N. Y., at Mount Sinai Hospital. Write to Dean	Oct. 26, 1942-Jan. 25, 1943. [2] Part time	Advanced Course in Clinical Neurology	Minimum: 6 [4]	$50
	Oct. 26, 1942-Jan. 25, 1943 [2]	Applied Neuroanatomy and Neuropathology, A and B	Minimum: 10	$60, $75
	Oct. 26. [2] Part time	Clinical Electroencephalography and Laboratory Training in Electroencephalography	Minimum: 3	$45
Columbia University, Faculty of Medicine, at the New York Postgraduate Medical School, 303 East 20th Street, New York, N. Y. Write to: Director of the School	Monthly, Oct.-May. 1 month or more	Clinical Neurology	1-6	$50 per mo. [3]
University of Pennsylvania Graduate School of Medicine, 227 Medical Laboratories, Philadelphia, Pa. Write to: Dr. H. C. Buerki, Dean, The Medico-Chirurgical College	Arranged. 8 weeks, part time	Clinical Psychiatry	Individuals [4]	$100
	Arranged. 10 weeks, part time	Clinicobiologic Neurology and Psychiatry	Individuals [30]	$100
PUBLIC HEALTH				
Loyola University School of Medicine. Write to: Miss McGowan, Secretary, Department of Preventive Medicine, Public Health and Bacteriology, 706 South Wolcott Avenue, Chicago, Ill.	Quarterly, Sept.-June	Courses in Administration, Laboratory, Education, Mental Hygiene and Sanitation	Individuals	Arranged
Johns Hopkins University, School of Hygiene and Public Health, 615 North Wolfe Street, Baltimore, Md. Write to: L. J. Reed, Dean	December. 2 months	Courses in Public Health.....	Limited [31]	Varies
University of Minnesota Medical School, Minneapolis, Minn. Write to: Dr. Harold S. Diehl, Dean	Jan. 4. 1-3 quarters	Courses for Training Medical Health Officers	....	$25, $50 [32]
New York State Department of Health, at Albany Medical College, 47 New Scotland Avenue, Albany, N. Y. Write to: Extension Course Office, Albany Medical College	Arranged. 1 year	Extension Course in Public Health	Limited [31]	$40
RADIOLOGY—See also Cardiology, Military Medicine				
Harvard University Medical School, 25 Shattuck Street, Boston, Mass. Write to: Dr. Frank R. Ober, Asst Dean, Courses for Graduates	Monthly. 1 month, part time	General Roentgenology	3 [33]	$100
	Monthly. 1 month, full time	General Roentgenology	2 [3]	$100
	Monthly. 1 month, full time	General Roentgenology	Limited [3]	$50
	Monthly, 1month, part time	Roentgenology in Diseases of the Eye, Ear and Accessory Sinuses	3	$25
Tufts Medical School, 30 Bennet Street, Boston, Mass. Write to Dr. Samuel Proger, Chairman, Postgraduate Division	Jan. 19-15, 1943. Full time	X-Ray Interpretation .....Minimum: 6		$25 [1]
Columbia University, Faculty of Medicine, at the New York Postgraduate Medical School, 303 East 20th Street, New York, N. Y. Write to: Director of the School	Jan. 4-March 26. [2] Part time	Basic Radiation Therapy.....	4-8 [4]	$125 [3]
New York Eye and Ear Infirmary, 218 Second Avenue, New York, N. Y. Write to: Mabel R. Stewart, Registrar	Monthly. [2] 6 weeks, part time	Ophthalmic and Otologic Roentgenology	Limited [3]	$40 [34]
New York Polyclinic Medical School and Hospital, 345 West 50th Street, New York, N. Y. Write to: Dr. F. H. Dillingham, Executive Officer	Monthly. 6 weeks or 3 months, full time	Diagnostic Roentgenology and Radiotherapy (Advanced)	10 [4]	$150, $300 [3]
RHINOLOGY—See Otolaryngology				
SURGERY—See also Special Headings				
Florida Medical Association, Inc. White to: Dr. T. E. Cason, Chairman, Medical Postgraduate Course, 2033 Riverside Avenue, Jacksonville, Fla.	Arranged. 2 weeks or more, full time	Orthopedic Surgery	10	$5
Tulane University of Louisiana School of Medicine, 1430 Tulane Avenue, New Orleans, La. Write to: Director, Dep't of Graduate Medicine	Nov. 30-Dec. 4. Full time	Emergency and Traumatic Surgery	....	Not stated
Maine Medical Association, 142 High Street, Portland, Maine. Write to: Dr. Frederick R. Carter, Chairman, Committee on Graduate Education	Arranged	Home Study Course.....	Limited [14]	None
Harvard University Medical School, 25 Shattuck Street, Boston, Mass. Write to: Dr. Frank R. Ober, Asst Dean, Courses for Graduates	Monthly. 1 month, part time	Clinical Orthopedic Surgery....	1 or more	$50
	Nov., Dec., Jan. 1 month or more, part time	Clinical Urology (Major Genito-Urinary Surgery)	Limited [29]	$75 per mo.
	November. 6 days, full time	Diagnosis and Treatment of Injuries to the Brain and Spinal Cord and Their Coverings	15	$40
	Monthly	Endoscopy	2	Arranged
	November. 4 weeks, full time	General Surgery	Minimum: 6	$200
	Nov., Dec. 1 month or more, part time	Genito-Urinary Surgery	4 [29]	$75 per mo.
	Arranged. 1 month, full time	Minor Surgery, Designed for Practitioners	Minimum: 5	$150

References will be found on p. 560

Continuation Courses for Practicing Physicians, October 15, 1942-January 15, 1943—Continued

Institution	Schedule of Course	Title of Course	Number of Students Accepted	Registration Fee and/or Tuition
SURGERY—See also Special Headings—Continued				
Columbia University, Faculty of Medicine, at the New York Postgraduate Medical School, 303 East 20th Street, New York, N. Y. Write to: Director of the School	Arranged. Part time	Blood Transfusion; Blood and Plasma Bank	1-8	$35 [6]
	Nov. 9-14.[2] Full time	Diagnosis and Treatment of Trauma	5-30	$35 [6]
	Arranged. Part time	Dissection and Surgical Anatomy	Minimum: 2 [4]	$125 [6]
	Arranged. Part time	Surgical Anatomy as Applied to Thoracic Surgery (Cadaver)	2-6 [4]	$125 [6]
Columbia University, Faculty of Medicine, 630 West 168th Street, New York, N. Y., at Mount Sinai Hospital. Write to Dean	Oct. 26-Dec. 18.[2] Part time	Advanced Course in Proctology for Surgeons	5-10 [4]	$65
Columbia University, Faculty of Medicine, 630 West 168th Street, New York, N. Y., at affiliated hospitals. Write to: Dean	Oct. 26-30.[2] Full time	Symposium on General Surgery	10-20 [4]	$75
New York Medical College, Flower and 5th Avenue Hospitals, 5th Avenue at 106th Street, New York, N. Y. Write to: Dr. J. A. W. Hetrick, Dean	Arranged. Part time	Surgical Technique (Dog).....	....	$250 [6]
New York Polyclinic Medical School and Hospital, 345 West 50th Street, New York, N. Y. Write to: Dr. F. H. Dillingham, Executive Officer	Jan. 2. 3 months, full time	Combined Surgical Course	10 [4]	$350 [6]
	Jan. 2. 6 weeks, full time	Operative Clinic and Lecture Course	10	$100 [6,22]
	Nov. 1. 4 weeks, part time	Plastic Reparative Surgery....	10	$250 [6]
University of Pennsylvania Graduate School of Medicine, 237 Medical Laboratories, Philadelphia, Pa. Write to: Dr. R. C. Buerki, Dean, The Medico-Chirurgical College	Arranged. 2 weeks, full time	Bronchoesophagology, Gastroscopy and Laryngeal Surgery	Individuals [4]	$250
American College of Surgeons, 40 Erie Street, Chicago, Ill., at the Stevens Hotel, Chicago. Write to: Dr. Bowman C. Crowell, Director	Nov. 17-20. Full time	Clinical Congress	Limited [23]	Not stated
SYPHILOLOGY—See Dermatology & Syphilology				
TUBERCULOSIS				
California Tuberculosis Association, 45 Second Street, San Francisco, Calif. Write to: Mr. William F. Higby, Secretary	Arranged. 1 week	Tuberculosis .....Individuals		None [24]
City of Chicago Municipal Tuberculosis Sanitarium. Write to Department of Clinics, 2049 Washington Boulevard, Chicago, Ill.	Arranged. 2 months, part time	Comprehensive Course in Tuberculosis	Minimum: 20	None
	Continuously	Tuberculosis	....	None
Mississippi State Sanatorium, Sanatorium, Miss. Write to: Dr. Henry Boswell, Superintendent	Arranged. 2 weeks or more	Clinical Medicine and Chest Diseases	....	None
New York Medical College, Flower and 5th Avenue Hospitals, 5th Avenue at 106th Street, New York, N. Y. Write to: Dr. J. A. W. Hetrick, Dean	Arranged. 1 month, full time	Diagnosis and Treatment.....	....	$100
UROLOGY—See also Anatomy, Surgery				
Harvard University Medical School, 25 Shattuck Street, Boston, Mass. Write to: Dr. Frank R. Ober, Asst Dean, Courses for Graduates	Monthly, Oct.-May. 1 month or more, full time	Urology	....	$75 per mo.
Michigan State Medical Society, Room 2049 University Hospital, Ann Arbor, Mich. Write to: James D. Bruce, Chairman, Postgraduate Education Program	Nov. 30-Dec. 4. Full time	Urology	....	Not stated
Long Island College of Medicine. Write to: Dr. Simon R. Blattels, Chairman, Joint Committee on Post-Graduate Education, 1313 Bedford Avenue, Brooklyn, N. Y.	Monthly. 1 month or more, part time	Urology	3	$25 per mo.
Columbia University, Faculty of Medicine at the New York Postgraduate Medical School, 303 East 20th Street, New York, N. Y. Write to: Director of the school	Arranged	Short Courses in Special Subjects	Individuals [4]	Arranged [6]
University of Pennsylvania Graduate School of Medicine, 237 Medical Laboratories, Philadelphia, Pa. Write to: Dr. R. C. Buerki, Dean, The Medico-Chirurgical College	Arranged. 6 weeks, part time	Cystoscopy, Chromouretero-scopy and Pyelography	Individuals [4]	$300
VENEREAL DISEASE CONTROL—See also Dermatology & Syphilology, Obstetrics & Gynecology				
Institute for the Control of Syphilis, University of Pennsylvania, 3400 Spruce Street, Philadelphia, Pa. Write to: Dr. John H. Stokes, Director	Arranged. 5 or 10 days	Management of Syphilis and Other Venereal Diseases	....	$25
	Arranged. 1 month or more	Management of Venereal Diseases	Individuals	$50 per mo.
United States Public Health Service Medical Center, Hot Springs National Park, Ark. Write to: Dr. Austin V. Delbert, Medical Officer	Oct. 21-24. Full time	Conference on Venereal Disease Control in War Time	....	None

1. A registration fee of $5 covers all courses taken within the year.
2. Register two to six weeks in advance.
3. Grants may be made from a scholarship fund.
4. Specialists who have had adequate preliminary training and/or experience.
5. If two or more students register for the course at the same time, a reduction in the fee will be made.
6. Special parts may be taken.
7. No registration fee for physicians in military service.
8. Includes a subscription to Modern Concepts of Cardiovascular Disease.
9. Physicians who have had adequate preliminary training and/or experience.
10. A monthly stipend is paid.
11. Applicants approved by instructor, department head, etc.
12. A temporary license to practice medicine in the state is required.
13. If taken in conjunction with the next course above/below (Gastroscopy/Peritoneoscopy) the fee for the combined course will be $135.
14. Members of the association.
15. Half fee to physicians in the military service.
16. Medical Reserve Officers, United States Army.
17. Officers of the United States Army, Navy, or the United States Naval Reserve on active duty.
18. Officers in key positions in the Medical Department on active duty.
19. Returned on satisfactory completion of the course.
20. Male physicians only.
21. For physicians licensed to practice in the state.
22. Maintenance provided.
23. The same course is given for Negro physicians at Lincoln Hospital, Durham, N. C.
24. Physicians who wish to specialize.
25. Plus a matriculation and/or incidental fee.
26. Longer courses may be arranged in units of twelve sessions each.
27. Microscope required.
28. Plus a laboratory fee.
29. Assistantships, internships, residencies available.
30. A faculty course for staff members of mental institutions.
31. Public health officers and other qualified persons who are not applying for a degree.
32. Operative work on the cadaver may be taken on payment of an additional fee.
33. Fellows and Junior Candidates of the college.
34. Expenses and a per diem are paid.

V 12 1942

Medical Examinations and Licensure

COMING EXAMINATIONS AND MEETINGS

ANNUAL CONGRESS ON MEDICAL EDUCATION AND LICENSURE

CHICAGO, Feb. 15-16, 1943. Sec., Council on Medical Education and Hospitals, Dr. H. G. Weiskotten, 535 North Dearborn Street, Chicago.

NATIONAL BOARD OF MEDICAL EXAMINERS EXAMINING BOARDS IN SPECIALTIES

Examinations of the National Board of Medical Examiners and Examining Boards in Specialties were published in THE JOURNAL, Oct. 10, page 473.

BOARDS OF MEDICAL EXAMINERS

ALABAMA: Montgomery, June 15-16. Sec., Dr. B. F. Austin, 519 Dexter Ave., Montgomery.

ARKANSAS: * *Medical.* Little Rock, Nov. 5-6. Sec., Dr. D. L. Owens, Harrison. *Eclectic.* Little Rock, Nov. 5. Sec., Dr. Clarence H. Young, 1415 Main St., Little Rock.

CALIFORNIA: *Written.* Sacramento, Oct. 19-22. *Oral examination* (required when reciprocity application is based on a state certificate or license issued ten or more years before filing application in California), San Francisco, Dec. 16. Sec., Dr. Charles B. Pinkham, 1020 N St., Sacramento.

CONNECTICUT: * *Medical. Written.* Hartford, Nov. 10-11. *Endorsement.* Hartford, Nov. 24. Sec. to the Board, Dr. Creighton Barker, 258 Church St., New Haven. *Homeopathic.* Derby, Nov. 10-11. Sec., Dr. Joseph H. Evans, 1488 Chapel St., New Haven.

DELAWARE: Dover, July 13-15. Sec., Medical Council of Delaware, Dr. Joseph S. McDaniel, 229 S. State St., Dover.

DISTRICT OF COLUMBIA: * Washington, Nov. 9-10. Sec., Commission on Licensure, Dr. George C. Ruhland, 6150 East Municipal Bldg., Washington.

FLORIDA: * Jacksonville, Nov. 23-24. Sec., Dr. William M. Rowlett, Box 786, Tampa.

HAWAII: Honolulu, Jan. 11-14. Sec., Dr. James A. Morgan, 48 Young Bldg., Honolulu.

IDAHO: Boise, Jan. 12. Dir., Bureau of Occupational Licenses, Mr. Walter Curtis, 355 State Capitol Bldg., Boise.

INDIANA: Indianapolis, Jan. 13-15. Sec., Board of Medical Registration and Examination, Dr. W. C. Moore, 301 State House, Indianapolis.

KANSAS: Topeka, Dec. 8-9. Sec., Board of Medical Registration and Examination, Dr. J. F. Hassig, 905 N. Seventh St., Kansas City.

KENTUCKY: Louisville, March 2-4. Sec., State Board of Health, Dr. A. T. McCormack, 620 S. Third St., Louisville.

MAINE: Portland, Nov. 3-4. Sec., Board of Registration of Medicine, Dr. Adam P. Leighton, 192 State St., Portland.

MARYLAND: *Medical.* Baltimore, Dec. 8-11. Sec., Dr. John T. O'Mara, 1215 Cathedral St., Baltimore. *Homeopathic.* Baltimore, Dec. 8-9. Sec., Dr. John A. Evans, 612 W. 40th St., Baltimore.

MASSACHUSETTS: Boston, Nov. 17-20. Sec., Board of Registration in Medicine, Dr. H. Q. Gallupe, 413-F State House, Boston.

MINNESOTA: * Minneapolis, Oct. 20-22. Sec., Dr. Julian F. Du Bois, 230 Lowry Medical Arts Bldg., St. Paul.

MISSISSIPPI: Jackson, December. Asst. Sec., State Board of Health, Dr. R. N. Whitfield, Jackson.

NEVADA: Carson City, Nov. 2-4. Sec., Dr. Frederick M. Anderson, 215 N. Carson St., Carson City.

NEW JERSEY: Trenton, Oct. 20-21. Sec., Dr. Earl S. Hallinger, 28 W. State St., Trenton.

NORTH CAROLINA: December. Sec., Dr. W. D. James, Hamlet.

NORTH DAKOTA: Grand Forks, Jan. 5-8. Sec., Dr. G. M. Williamson, 4½ S. Third St., Grand Forks.

OHIO: Columbus, December. Sec., Dr. H. M. Platter, 21 W. Broad St., Columbus.

OKLAHOMA: * Oklahoma City, Dec. 9. Sec., Dr. J. D. Osborn, Jr., Frederick.

OREGON: *Reciprocity.* Portland, Oct. 23. *Written.* Portland, January. Exec. Sec., Miss Lorienne M. Conlee, 608 Failing Bldg., Portland.

PENNSYLVANIA: Philadelphia, January. Act. Sec., Bureau of Professional Licensing, Mrs. Marguerite G. Steiner, Department of Public Instruction, 358 Education Bldg., Harrisburg.

TEXAS: Austin, Dec. 28-30. Sec., Dr. T. J. Crowe, 918-20 Texas Bank Bldg., Dallas.

UTAH: Salt Lake City, June. Dir., Department of Registration, Mr. G. V. Bullings, 324 State Capitol Bldg., Salt Lake City.

VERMONT: Burlington, March 25-27. Sec., Dr. F. J. Lawliss, Richford.

VIRGINIA: Richmond, Dec. 8-11. Sec., Dr. J. W. Preston, 30½ Franklin Rd., Roanoke.

WEST VIRGINIA: Charleston, Oct. 26-28. Commissioner, Public Health Council, Dr. C. F. McClintic, State Capitol, Charleston.

WISCONSIN: * Madison, Jan. 12-14. Sec., Dr. H. W. Shutter, 425 E. Wisconsin Ave., Milwaukee.

* Basic Science Certificate required.

BOARDS OF EXAMINERS IN THE BASIC SCIENCES

DISTRICT OF COLUMBIA: Washington, Oct. 19-20. Sec., Commission on Licensure, Dr. George C. Ruhland, 6150 East Municipal Bldg., Washington.

NEW MEXICO: Albuquerque, Feb. 1. Sec., Miss Pia Joerger, State Capitol, Santa Fe.

OKLAHOMA: Oklahoma City, May. Sec., Dr. Oscar C. Newman, Shattuck.

OREGON: Portland, Oct. 31. Sec., State Board of Higher Education, Mr. Charles D. Byrne, University of Oregon, Eugene.

RHODE ISLAND: Providence, Nov. 18. Chief, Division of Examiners, Mr. Thomas B. Casey, 366 State Office Bldg., Providence.

SOUTH DAKOTA: Sioux Falls, Dec. 4-5. Sec., Dr. G. M. Evans, Yankton.

Kentucky May Report

The State Board of Health of Kentucky reports the written examination for medical licensure held at Louisville, May 27-29, 1942. The examination covered 11 subjects and included 110 questions. An average of 70 per cent was required to pass. Eighty-four candidates were examined, all of whom passed. The following schools were represented:

School	PASSED	Year Grad.	Number Passed
Howard University College of Medicine		(1941)	1
University of Chicago, The School of Medicine		(1941)	1
University of Louisville School of Medicine		(1941, 3), (1942, 77)	80
University of Pennsylvania School of Medicine		(1941)	1
University of Tennessee College of Medicine		(1942)	1

Eleven physicians were licensed to practice medicine by reciprocity and 2 physicians so licensed by endorsement from April 6 through June 30. The following schools were represented:

School	LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
University of Kansas School of Medicine		(1939)	Kansas
Johns Hopkins University School of Medicine		(1920)	Maryland
University of Michigan Department of Medicine and Surgery		(1899)	Michigan
New York University College of Medicine		(1938)	Tennessee
Western Reserve University School of Medicine		(1926), (1930)	Ohio
Woman's Medical College of Pennsylvania		(1922)	S. Carolina
College of Physicians and Surgeons, Memphis		(1911)	Tennessee
University of Tennessee College of Medicine		(1939), (1941)	Tennessee
Vanderbilt University School of Medicine		(1932)	Penna.

School	LICENSED BY ENDORSEMENT	Year Grad.	Endorsement of
Tulane University of Louisiana School of Medicine		(1935)	U.S.P.H.S.
Duke University School of Medicine		(1939)	N. B. M. Ex.

Texas June Report

The Texas State Board of Medical Examiners reports the written examination for medical licensure held at Dallas, June 4-6, 1942. The examination covered 12 subjects and included 120 questions. An average of 75 per cent was required to pass. One hundred candidates were examined, 95 of whom passed and 5 failed. Twenty-four physicians were licensed to practice medicine by reciprocity. The following schools were represented:

School	PASSED	Year Grad.	Number Passed
Northwestern University Medical School		(1941)	1
Johns Hopkins University School of Medicine		(1939)	1
Creighton University School of Medicine		(1941, 2)	2
Duke University School of Medicine		(1938)	1
University of Pennsylvania School of Medicine		(1941), (1942)	2
Baylor University College of Medicine		(1942, 69)	69
University of Texas Medical Branch		(1942, 6)*	6
Marquette University School of Medicine		(1942)	1
University of Wisconsin Medical School		(1941, 2)	2
Osteopaths †			10

School	FAILED	Year Grad.	Number Failed
Creighton University School of Medicine		(1941)	1
Baylor University College of Medicine		(1942)	1
University of Texas Medical Branch		(1941)	1
Universidad Nacional Facultad de Medicina, México		(1937)	1
Osteopath †			1

School	LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
University of Arkansas School of Medicine		(1938), (1939)	Arkansas
College of Medical Evangelists		(1939)	California, (1939) Louisiana
University of Colorado School of Medicine		(1937)	Colorado
George Washington University School of Medicine		(1934)	Arizona
Rush Medical College		(1902)	California, (1911)
University of Kansas School of Medicine		(1932)	Wisconsin
Louisiana State University School of Medicine		(1940), (1942, 2)	Kansas
Tulane University of Louisiana School of Medicine		(1940)	Louisiana
University of Michigan Medical School		(1937)	Mississippi
St. Louis University School of Medicine		(1935)	California
Washington University School of Medicine		(1931)	Missouri
University of Nebraska College of Medicine		(1940)	Missouri
Ohio State University College of Medicine		(1922)	Nebraska
Ohio Medical University		(1906)	Ohio
Meharry Medical College		(1937)	Ohio
University of Tennessee College of Medicine		(1931)	Tennessee
Marquette University School of Medicine		(1922)	Tennessee
University of Wisconsin Medical School		(1936)	Wisconsin
University of Sheffield Faculty of Medicine		(1937)	Ohio
			New York

* Licenses have not been issued.

† Examined in medicine and surgery.

Bureau of Legal Medicine and Legislation

MEDICOLEGAL ABSTRACTS

Workmen's Compensation Acts: Neurosis Resulting from Traumatic Shock Compensable.—A large amount of rock and muck accidentally fell on the shoulders, neck and back of the workman while he was engaged in the performance of his duties as a miner. His shoulders and neck were bruised and a gash was inflicted on the back of his right hand which required several stitches to close. He remained away from work for four days, resumed his work for about two weeks, laid off for a week and then worked two days, by which time he found the pain to the back of his neck and shoulders so great that he could not continue. About ten days later his left arm suddenly became paralyzed and his condition continued to grow worse, until at the time of the hearing on his claim for compensation under the workmen's compensation act of Arizona his left shoulder and arm were practically paralyzed. The industrial commission of Arizona awarded him compensation, finding that he had sustained an injury by accident arising out of and in the course of his employment. The employer then appealed to the Supreme Court of Arizona.

The employer contended that the workman's present condition was not one which would entitle him to compensation under the workmen's compensation act of Arizona, arguing that the workman's condition, while real and in no sense the result of malingering, was one of functional paralysis caused by an anxiety neurosis induced by the accident alone and not by the injury, and that under the Arizona law the condition was not compensable. The workman contended that his paralytic condition was a neurosis resulting directly from an injury received in the industrial accident. Physicians who examined the workman, said the court, unanimously concluded that the paralytic condition was functional and not organic and was "suggested" by the industrial accident. The employer contended that the conclusion of the examining physicians is a specific statement that the injury had no connection with the admitted neurosis but that the latter was an anxiety neurosis resulting solely from the accident itself. On the other hand, the workman contended that the physicians were not familiar with the technical legal interpretation of the word "accident" as used in the workmen's compensation act and used the word merely in a colloquial sense of meaning both the accident and the injury resulting therefrom on July 12. We think, said the court, that the industrial commission was justified in finding, as it must have, that it was more probable that in using the word "accident" the physicians referred to the entire picture of the situation as it appeared on July 12 rather than to the technical accident alone, excluding the admitted traumatic injury resulting therefrom.

All the parties, continued the court, agree that the workman's condition is a post-traumatic neurosis of some kind. A neurosis is a disease. Many medical authorities divide post-traumatic neurosis into three general classes; post-traumatic neurasthenia, post-traumatic anxiety neurosis and post-traumatic hysteria neurosis. The symptoms in the neuroses are generally subjective in their nature, and, while some of the symptoms of each of these three classes are similar, yet there are others which are distinctive enough to justify the classification. On consideration of the testimony of all the examining physicians, together with that of the workman, we think that the industrial commission was fully justified in believing that the workman's condition was what is known as post-traumatic hysteria rather than anxiety neurosis and that this former class of neurosis very commonly, if not usually, arises from shock resulting from some accident. In view of the history of the case, we think that the natural, if not the irresistible, conclusion is that the workman's condition was a post-traumatic hysteria neurosis resulting from a shock caused by the accident of July 12. Now under the workman's compensation act of Arizona the only condition that is compensable is a personal injury arising out of and in the course of employment, and it is specifically stated that a disease is not compensable unless it is a disease resulting from the injury. Is the workman suffering from a disease resulting from the injury? The answer depends on whether shock, in the medical sense of the term, is itself legally an injury. The English courts have always held that a nervous shock resulting from an accident is just as much an injury as any muscular or bodily consequences which are objectively discernible. This ruling is followed in many American cases in which a similar question has arisen, and this sort of holding is justified in reason in our opinion. We therefore hold that a nervous shock caused by an accident arising out of and in the course of an employment is a compensable "injury" within the meaning of the Arizona act. Since a shock is a compensable injury and neurosis is a disease, a hysteria neurosis caused by a shock is a "disease . . . resulting from the injury." On the record in the present case, the industrial commission was justified in finding that the workman's condition was due to a disease resulting from an injury caused by an accident arising out of and in the due course of his employment.

The court further held that there was sufficient evidence from which the industrial commission might have found, as it must have in order to make its award, that the workman's neurosis was the result of the traumatic shock which he received and was not due to a deep set fear or apprehension of imaginary ailments that might follow as a result of his injury. If the workman's condition had been due to the latter possibility, the condition would not have been compensable in view of previous decisions of the Supreme Court of Arizona in *Pierce* v. *Phelps Dodge Corp.*, 42 Ariz. 436, 26 P. (2d) 1017 and *Phelps Dodge Corp.* v. *Industrial Commission of Arizona and Eads*, 46 Ariz. 162, 49 P. (2d) 391.

For the reasons stated, the award of compensation in favor of the workman was affirmed.—*American Smelting & Refining Co. v. Industrial Commission, 123 P. (2d) 163 (Ariz., 1942).*

Use of Fifteen Year Old Boy as Skin Donor Without Consent of Parents as Constituting Assault and Battery.—The cousin of the plaintiff, a 15 year old Negro boy, was so severely burned that she became a hopeless cripple. She was attended in the charity clinic of a hospital by the physician defendant, a specialist in plastic surgery. The physician advised a skin graft provided the blood of the donor matched the patient's blood. After a number of unsuccessful efforts to match her blood were made, it was ascertained that the plaintiff's blood matched and, unbeknown to his mother with whom he lived and who was ill at the time and knew nothing of the arrangements, the boy permitted the physician to perform an "operation," in the words of the court, on his side. After the "operation" the boy returned home and while there advised his mother that he was returning to the hospital to have his side "fixed up." He remained in the hospital about two months, during which time a number of operations were performed on him. A tube of flesh was cut and formed from his armpit to his waist line, and at the proper time one end of the tube was attached to his cousin. The result was unsatisfactory because of improper circulation of the blood through the tube. Accordingly, the tube was severed after the boy had lost a considerable amount of blood and himself required transfusions. The tube of flesh was later removed and the plaintiff was released from the hospital. Subsequently, the plaintiff, by his next friend, his mother, sued the physician defendant to recover damages for assault and battery on the theory that the physician had not obtained proper authority before operating on the minor plaintiff. At the conclusion of all the evidence the court instructed the jury that if they believed that the plaintiff himself was capable of appreciating and did appreciate the nature and consequences of the operation and actually consented, or by his conduct impliedly consented, their verdict must be for the defendant. There was a verdict for the physician, and from a judgment entered thereon the plaintiff appealed to the United States Court of Appeals for the District of Columbia.

The plaintiff contended that the trial court erred in the instruction because a performance of an operation on a minor without the consent of his surviving parents constitutes an assault and battery. The general rule is, said the appellate court, that the consent of the parent is necessary for an operation on a child. A surgical operation is a technical battery, regardless of its results, and is excusable only when there is express or implied consent by the patient or, stated somewhat differently, the operating physician is liable in damages if the operation is unauthorized. Here the question is whether the consent of a boy 15 years of age dispenses with the necessity of consent by his parents. The trial court decided that it did and in so deciding it followed section 59 of the American Law Institute's Restatement of the Law of Torts, which states that if a child is capable of appreciating the nature, extent and consequences of the invasion, his assent prevents the invasion from creating liability, even though the assent of the parent is expressly refused. The rule adopted by the American Law Institute, continued the court, is bottomed on the principle that the very nature of rights of personality is freedom to dispose of one's own person as one pleases. But even if this conclusion is granted, it overlooks the infancy exception to such a rule. In deference to common experience, there is general recognition of the fact that many persons by reason of their youth are incapable of intelligent decision, as the result of which public policy demands the legal protection of their personal as well as their property rights. The universal law, therefore, is that a minor cannot be held liable on his personal contracts or contracts for the disposition of his property. So also in the case of female infants the age of consent has been raised in many states from 12 years to 18 years. Likewise in most states the legal age for marriage, both of males and females, has been greatly increased over the common law standard, and where either party is under 21 years of age the consent of parents is required. Hence it is not at all surprising that, generally speaking, the rule has been considered to be that a surgeon has no legal right to operate on a child without the consent of his parents or guardian. There are, of course, exceptions to this rule. One of them is in cases of emergency, when obviously an operation is necessary. Others, perhaps in cases in which the child has been emancipated or where the parents are so remote as to make impracticable the obtaining of their consent in time to accomplish proper results. And where the child is close to maturity it has been held that the surgeon may be justified in accepting his consent. Bakker v. Welsh, 144 Mich. 632, 108 N. W. 94. But in all such cases the basic consideration is whether the proposed operation is for the benefit of the child and is done with a purpose of saving his life or limb. The circumstances in the present case are wholly without the compass of any of these exceptions. Here the operation was entirely for the benefit of another and involved sacrifice on the part of the infant of fully two months of schooling, in addition to serious physical pain and possible results affecting his future life. This immature Negro boy was subjected several times to treatment involving anesthesia, blood letting and the removal of skin from his body, with at least some permanent marks of disfigurement.

As authority for his contention that the consent of the infant under the circumstances was a sufficient authority for the performance of the operative procedures, the physician cited, in addition to the statement in the Restatement of the Law of Torts above referred to, Bakker v. Welsh, 144 Mich. 632, 108 N. W. 94, where an operation was performed on a 17 year old boy without the express consent of his father, the consent of the minor ultimately being held to be sufficient authority to authorize the surgeon to operate. But, said the appellate court, the question here is different from that in any of the cases to which our attention has been drawn, for here we have a case of a surgical operation not for the benefit of the person operated on but for another, and also so involved in its technic as to require a mature mind to understand precisely what the donor was offering to give. We believe, therefore, that the trial court should in the circumstances have instructed that the consent of the parent was necessary. Undoubtedly the case from the standpoint of the physician defendant is a hard one. At all times he was rendering, without compensation, his skill and professional services to alleviate pain and suffering. Doubtless this fact weighed with the jury, who regarded his activities in the matter as impelled wholly by humane and charitable motives. But by his own testimony it clearly appears that he failed to explain, even to the infant, the nature or extent of the proposed first operation. As to those which followed, he claims that the matter was fully explained. And there is evidence that during the ensuing progress of the experiment the mother, too, was apprised of her son's heroism and gloried in the newspaper notoriety which followed and which apparently resulted in public contributions of money for the boy's future education. Whether this attitude of the mother was a sufficient ratification, we need not here decide, since that question is not now at issue. However, if on a new trial the evidence in this respect is substantially the same, the question whether or not there was consent by ratification by the mother should be submitted to the jury under appropriate instructions. And if, after the mother learned of the preliminary operation, she made no objection thereto but publicly expressed her pride in her son's courage and without remonstrance allowed him to return for the completion of the experiment, such action on her part would be tantamount to consent by implication and that, under the circumstances, would be sufficient authority on which the physician could proceed with his operative procedures.

For the reasons stated, the judgment in favor of the physician was reversed and the cause was remanded for a new trial.—*Bouner v. Moran, 126 F. (2d) 121 (1941).*

Malpractice: Services of X-Ray Technician as Constituting Practice of Medicine.—In this case, the supreme court, special term, New York County, held that the services rendered by an x-ray technician in a hospital constituted the practice of medicine as defined by subdivision 7 of section 1250 of the Education Law. Therefore an action to recover damages for injuries caused by the negligent administration of roentgen treatment by such technician was governed by the two year statute of limitations applicable to malpractice actions rather than by the three year statute of limitations applicable to actions for negligence generally.—*Leitch v. Mulcahy, 31 N. Y. S. (2d) 874 (N. Y., 1941).*

Society Proceedings

COMING MEETINGS

American Academy of Pediatrics, Chicago, Nov. 4-7. Dr. Clifford G. Grulee, 636 Church St., Evanston, Ill., Secretary.

American College of Surgeons, Cleveland, November 17-20. Dr. Frederic A. Besley, 40 East Erie Street, Chicago, Secretary.

American Public Health Association, St. Louis, Oct. 27-30. Dr. Reginald M. Atwater, 1790 Broadway, New York, Executive Secretary.

American Society of Anesthetists, New York, Dec. 10. Dr. Paul M. Wood, 745 Fifth Ave., New York, Secretary.

Annual Conference of Secretaries of Constituent State Medical Associations, Chicago, Nov. 20-21. Dr. Olin West, 535 North Dearborn St., Chicago, Secretary.

Association of American Medical Colleges, Louisville, Ky., Oct. 26-28. Dr. Fred C. Zapffe, 5 South Wabash Ave., Chicago, Secretary.

Association of Military Surgeons of the United States, San Antonio, Texas, Nov. 5-7. Colonel James M. Phalen, Army Medical Museum, Washington, D. C., Secretary.

Inter-State Postgraduate Medical Association of North America, Chicago, October 26-30. Dr. Arthur G. Sullivan, 16 North Carroll Street, Madison, Wis., Managing Director.

New York State Association of Public Health Laboratories, Albany, Nov. 6. Miss Mary B. Kirkbride, New Scotland Ave., Albany, Secretary.

Omaha Mid-West Clinical Society, Omaha, Oct. 26-30. Dr. J. D. McCarthy, 1036 Medical Arts Bldg., Omaha, Secretary.

Puerto Rico, Medical Association of, Santurce, Dec. 11-13. Dr. E. Martinez Rivera, P. O. Box 3866, Santurce, Secretary.

Radiological Society of North America, Chicago, Nov. 30-Dec. 4. Dr. Donald S. Childs, 607 Medical Arts Bldg., Syracuse, N. Y., Secretary.

Southern Medical Association, Richmond, Va., November 10-12. Mr. C. P. Loranz, Empire Building, Birmingham, Ala., Secretary.

Southern Surgical Association, Savannah, Ga., Dec. 8-10. Dr. Alton Ochsner, 1430 Tulane Ave., New Orleans, Secretary.

Western Surgical Association, Memphis, Tenn., Dec. 4-5. Dr. Arthur R. Metz, 2449 Washington Blvd., Chicago, Secretary.

Current Medical Literature

AMERICAN

The Association library lends periodicals to members of the Association and to individual subscribers in continental United States and Canada for a period of three days. Three journals may be borrowed at a time. Periodicals are available from 1932 to date. Requests for issues of earlier date cannot be filled. Requests should be accompanied by stamps to cover postage (6 cents if one and 18 cents if three periodicals are requested). Periodicals published by the American Medical Association are not available for lending but can be supplied on purchase order. Reprints as a rule are the property of authors and can be obtained for permanent possession only from them.

Titles marked with an asterisk (*) are abstracted below.

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Problem of Unsuspected Tuberculosis in Pregnancy: Incidence by Roentgenologic Technics Compared with Incidence of Unsuspected Syphilis. C. W. Eisele, W. B. Tucker, Chicago; R. W. Vines, Rochester, Minn., and J. L. Batty, Hibbing, Minn.—p. 183.

Progress in Myomectomy: Surgical Measure and Diagnostic Aids Favoring Lower Morbidity and Mortality. I. C. Rubin, New York.—p. 196.

Sources of Error in Detection of Ovulation: Correlation of Vaginal Smear Studies with Urinary Pregnanediol Glucuronidate Determinations. L. Krohn, J. Harris and O. Hechter, Los Angeles.—p. 213.

*Electrometric Timing of Human Ovulation. L. Langman, New York, and H. S. Burr, New Haven, Conn.—p. 223.

*Prostigmine Methylsulfate and Delayed Menstruation: Evaluation of Prostigmine as Test for Pregnancy. L. B. Winkelstein, New York.—p. 231.

Experimentally Produced Fibroids in Guinea Pig and Their Possible Analogy to Myomas in Human Being. R. Marx, S. Glass and A. Shulman, Los Angeles.—p. 259.

*Clinical Observations in Treatment of Nausea and Vomiting in Pregnancy with Vitamins B_1 and B_6: Preliminary Report. R. S. Willis, W. W. Winn, A. T. Morris, A. A. Newsom and W. E. Massey, Dallas, Texas.—p. 265.

*Vitamin E and Premature Labor. E. Shute, London, Ont., Canada.—p. 271.

Mortality of Prematurely Born Infants: Influence of Certain Antenatal and Postnatal Factors. A. W. Diddle and E. D. Plass, Iowa City.—p. 279.

Vaginal Trichomoniasis: Complement Fixation, Puerperal Morbidity and Early Infection of Newborn Infants. R. E. Trussell and Mary E. Wilson, in cooperation with F. H. Longwell and K. A. Laughlin, Iowa City.—p. 292.

Methods for Objective Evaluation of Estrogen Therapy in Menopause. H. G. Bennett Jr., Oklahoma City.—p. 296.

Diagnosis and Treatment of Carcinoma of Corpus Uteri Based on Experiences at the Woman's Hospital. G. G. Ward, New York.—p. 303.

Bilateral Dry Gangrene of Both Lower Extremities Due to Ergot. A. S. Velkoff and A. D. Ferguson, Atlanta, Ga.—p. 331.

Bilateral Ovarian Carcinoma Associated with Intrauterine Pregnancy. L. J. Bossert, Cincinnati.—p. 336.

Simplified Method of Glycogen Estimation in Uterine Mucosa for Clinical Purposes. B. Zondek and B. Shapiro, Jerusalem, Palestine.—p. 345.

Electrometric Timing of Human Ovulation.—In determining with certainty the time of ovulation in 7 women (one hundred and fifty daily records of the menstrual cycle) Langman and Burr developed an electrical simplified technic which makes it possible to record the changes in voltage gradient which exist between the cervix uteri and some different point on the surface of the body, such as the ankle. The studies showed that most commonly throughout the menstrual cycle the cervix was positive to the ankle from 5 to 25 millivolts. In nine of the fourteen cycles studied the cervix became negative, an equivalent amount on at least one day of each cycle. In four of these the cervix remained negative for two days. The negativity appeared on the third, sixth, seventh, eighth, thirteenth, fourteenth, eighteenth or twenty-first days. In five cycles either no negative shift occurred or it was equivocal. The general muscular activity of the uterus was reflected in changing potentials and that this activity is an important element in the physiology of the generative tract was shown by the fact that all the electrical records showed a higher level of activity as early as the sixth and as late as the twenty-first day of the cycle. An additional interesting observation was that on the fourth or fifth day prior to the onset of a succeeding menstrual period, the positivity of the cervix increased to as much as 30 or 35 millivolts and usually remained there until the actual onset of bleeding. With the onset of the flow the voltage difference dropped to more nearly the normal 15 millivolts. There are a good many variables involved in the physiology of the generative tract. This is true also of ovulation; but the fact that it was possible to get at least one positive correlation makes it worth while to extend these studies. While the procedure is relatively simple, certain safeguards against artefacts must be employed as the hot lead goes to the cervix and not to the wall of the vagina. Unsuspected grounds on the patient and air bubbles in the leads to the electrodes are sources of error. Interference from other electrical devices can usually be recognized without difficulty. The injection of estrogen produced a pronounced effect on the electrical record. The data suggest the possibility of studying the effect of a variety of hormones on generative physiology.

Prostigmine Methylsulfate and Delayed Menstruation.—To determine the efficacy of prostigmine methylsulfate in differentiating between delayed menstruation and early pregnancy, Winkelstein investigated 90 women complaining of temporary amenorrhea who asked for such a diagnosis. All injections were given intramuscularly once daily for three days. If menstruation was precipitated before the series was completed, further injections were not given. Excluding temporary vertigo and nausea no untoward effects ensued, except for 1 patient, who collapsed. Shock lasted for about fifteen minutes. Recovery was spontaneous and complete. There was no explanation for this reaction. The prostigmine successfully differentiated early pregnancy from temporary amenorrhea by inducing delayed menstrual flow in about 87 per cent of the women. The responses to prostigmine were checked against a physical examination and, when necessary, against the Aschheim-Zondek test. In the nongravid, bleeding started after an average interval of fourteen hours following the last injection. In contrast to the Aschheim-Zondek test, which is known to err, especially on the negative side, in the early stages after the first skipped period all 6 patients tested during the first week of amenorrhea were accurately diagnosed as pregnant by prostigmine. However, discrepancies occurred in both positive and negative responses. Eight nongravid patients continued with their amenorrhea despite the injections, and 4 who were pregnant bled following the injections. This is the greatest hazard in using the drug. The prostigmine test should be useful in keeping many women from unnecessary manipulations at the hand of the abortionist.

Vitamins B_1 and B_6 in Vomiting of Pregnancy.—Eighty-one women suffering from hyperemesis of pregnancy obtained almost complete relief from nausea and vomiting by the administration of vitamins B_1 and B_6 in varying doses at irregular intervals. Willis and his associates gave the vitamins intramuscularly or intravenously. Relief occurred more often and more completely with the use of vitamin B_6. Many patients returned for injections only when symptoms reappeared. There were no undesirable reactions. Two patients were also relieved of an accompanying migraine. The effect of this vitamin on vomiting due to other drugs, morphine and sulfanilamide, should be investigated.

Vitamin E and Premature Labor.—The only therapy that Shute used for 46 women threatened with premature delivery was vitamin E. Premature expulsion of the fetus at any stage of pregnancy may be due to more than one single cause, but vitamin E equilibrium appears to be the most important primary cause. An excess of estrogen was discovered early in the pregnancy of 73 per cent (76 per cent went to term) of the 40 patients tested for it and also by the success of vitamin E in preserving many of these precarious gestations. Probably more of the pregnancies could have been preserved had larger doses of vitamin E been used prophylactically. Results have improved greatly since the author has begun using larger doses. The therapy should be maintained until delivery at term. Only potent preparations should be used; the best is a fresh refrigerated bulk wheat germ oil or a synthetic alpha-

tocopherol. Much more bleeding can occur in late than in early pregnancy without unduly jeopardizing its integrity. This is probably due to the greater proportion of adequately adherent placentas that remain undisturbed in the former. Many times the estrogen assay has foretold trouble months before it was clinically obvious. The dose of vitamin E required to preserve a precarious pregnancy rises gradually toward term. Only 3 of the 41 live children in the series were defective; cleft palate and harelip, congenital bile duct obliteration and anencephalus with clubfeet and extrocardia. Only 1 of the 3 defective children as long as three months. Therefore the lives of 38 children were preserved by nature or vitamin E or both. Doubtless some of the threats to premature delivery would have subsided without the administration of any treatment, but the author ascribes the outcome more to vitamin E than to fate.

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*Chemotherapy in Osteomyelitis. A. O. Wilensky, New York.—p. 76.
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Vitamin K and Its Role in Blood Coagulation. A. J. D'Alessandro, Newark, N. J.—p. 104.
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Ovarian Lesions Simulating Appendicitis. E. F. McLaughlin, Philadelphia.—p. 114.
Principles of Surgical Technic, with Comparison of Results Obtained with Fine Silk, Fine Chromic Catgut and Large Catgut (Chromic and Plain). C. H. Lupton, Norfolk, Va.—p. 122.
Reimplantation of Tibial Spine in Avulsion Fracture of Anterior Crucial Ligament. W. R. MacAusland, Boston.—p. 138.

Chemotherapy in Osteomyelitis.—Wilensky discusses his experience with the sulfonamide drugs in the treatment of acute inflammation of the bones of bacterial origin (acute osteomyelitis) and of chronic osteomyelitis when a recrudescence or an exacerbation made it an "acute" case. Such chemotherapy has not produced the startling results that it has had in some other diseases, notably pneumonia. The results have varied from negative to occasional extremely satisfactory effects. They have been relatively good in the phase of general infection (bacteremia) and relatively without effect and sometimes dangerous as far as the local focus of osteomyelitis in the bone was concerned. The results were not always predictable, owing to occasional difficulty in maintaining the proper concentration, necessity of matching the proper drug to the provocative organism, occurrence of certain toxic effects and the inherent difficulty in removing inaccessible foci of infection by surgical means. Chemotherapy has not prevented spread of the pathologic condition or the occurrence of complications. Sometimes the proper interpretation of good results is difficult, as unaided spontaneous beneficial changes undoubtedly occur. In making any conclusions regarding the action of any of the new chemotherapeutic drugs in osteomyelitis, the possibilities for spontaneous unaided recovery should be remembered.

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*Hemorrhage from Trachea, Bronchi and Lungs of Nontuberculous Origin. C. L. Jackson and S. Diamond, Philadelphia.—p. 126.
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New Method of Staining Tubercle Bacilli. E. Weiss, Chicago.—p. 199.
Device for Infecting Animals by Inhalation. J. L. Blaisdell and A. Hambleton, London, Ont., Canada.—p. 205.

Hemorrhage in the Nontuberculous.—Hemoptysis frequently has its origin in lesions other than tuberculous. To investigate the nontuberculous bases for tracheal and bronchopulmonary hemorrhage Jackson and Diamond made a survey of 436 such patients observed at Temple University Hospital from January 1930 to July 1941. Patients with evident parenchymal disease, those whose hemoptysis was due directly to trauma inflicted by aspirated foreign bodies and those with lesions outside the tracheobronchial tree and the lungs were eliminated. The principal lesion was bronchiectasis in 138, primary bronchial carcinoma in 82, tracheobronchitis in 74, pulmonary abscess in 51, no evident disease in 34, nonsuppurative pneumonitis in 15, suppurative pneumonitis in 11, bronchial adenoma in 11, secondary pulmonary cancer in 6, lobar atelectasis in 4, primary tracheal carcinoma in 2, and in 8 there were eight different principal lesions, such as streptothricosis, bronchiolithiasis and tracheal osteoma. Fatal hemoptysis was experienced by only 3 of the patients, each of whom had a pulmonary abscess. A hemorrhagic focus could be seen on bronchoscopic examination in 25 per cent. There was no endoscopic evidence of recent or active bleeding from a vascular lesion in the tracheobronchial tree of any of the patients. Ulcerative lesions probably existed in the smaller bronchi of the patients (about one fourth) for whom the precise cause of the hemoptysis could not be determined. Despite the fact that in 90 per cent of the patients with hemorrhagic bronchial cancer the neoplasm was situated in a bronchoscopically accessible bronchus and that bronchoscopy was performed soon after the first hemorrhage, the process in all but 1 was too far advanced to permit surgical cure. If a successful therapeutic result is to be achieved for these patients bronchoscopy must be done and the diagnosis made before the hemoptysic stage.

Cadmium in Treatment of Tuberculosis.—Negative results were obtained by Dormer and his associates in the treatment of 26 tuberculous patients with cadmium sulfide. The optimistic reports of previous workers were not confirmed.

Undiagnosed Tuberculosis.—As part of its case finding program one of the New York City Department of Health tuberculosis clinics has utilized its facilities and personnel to study roentgenologically an adult group of apparently healthy low income persons. Cut paper films, 14 by 17 inches, were used in standard x-ray equipment for the 3,414 persons from 15 to more than 75 years of age examined. Miller and Henderson state that 10.63 per cent of all males and 6.36 per cent of all females examined had chronic pulmonary tuberculosis, while for significant tuberculosis the figures were 4.55 and 1.67. Twenty-nine of the 100 clinically significant cases were proved to be active. All forms of tuberculosis were more common in the older than in the younger individuals. Significant tuberculosis and active tuberculosis were approximately three times as common in persons more than 40 as in younger ones. Twelve of the 13 with positive sputum were more than 50. Case finding should be more vigorous in higher age groups.

Archives of Ophthalmology, Chicago

28:197-384 (Aug.) 1942

Primary Sarcoma of Iris (Malignant Melanoma): Report of Three Cases. S. H. McKee, Montreal, Canada.—p. 197.
*Sodium Sulfathiazole Iontophoresis. J. L. Boyd, New York.—p. 205.
Concept of Zonular Chamber: Preliminary Report. H. Minsky, New York.—p. 214.
Traumatic Myopia with Hypotony: Report of Two Cases with Review of Literature. S. A. Fox, New York.—p. 218.
Process of Learning Simultaneous Binocular Vision. Clara Burri, Chicago.—p. 235.
Superficial Punctate Keratitis in Milian's Erythema of Ninth Day. E. B. Gresser and E. W. Thomas, New York.—p. 245.
Conjunctival Myiasis Due to Estrus Ovis: Report of Case. H. S. Hedges and M. K. Humphries Jr., Charlottesville, Va.—p. 251.
Seasonal Variations in Phospholipid Content of Crystalline Lenses, with Special Reference to Climatologic Influences. P. W. Salit, Iowa City.—p. 254.
Parallactic Angle in Binocular Depth Perception. J. I. Pascal, New York.—p. 258.
Fibroma of Orbit. J. G. Fowler and K. L. Terplan, Buffalo.—p. 263.
The Cornea: III. Hydration Properties of Excised Corneal Pieces. V. E. Kinsey and D. G. Cogan, Boston.—p. 272.
Observations on Entoptic Phenomena. B. Friedman, New York.—p. 285.
Evidence for Circulation of Aqueous and Its Relation to Glaucoma. H. S. Sugar, Vancouver, Wash.—p. 315.

Sodium Sulfathiazole Iontophoresis.—According to Boyd, iontophoresis of a 5 per cent solution of sodium sulfathiazole with 1 milliampere for two minutes when compared with a corneal bath of equal duration increases the corneal and aqueous humor concentration of sulfathiazole by three times. With a current of 2 milliamperes the concentration in the cornea and in the aqueous humor is increased ten and nine times respectively. There was no ocular damage with the use of a current that produces a concentration of sulfathiazole consistent with an optimal bacteriostatic effect.

Arkansas Medical Society Journal, Fort Smith

39:67-84 (Aug.) 1942

Contact Dermatitis. E. P. Cope, Little Rock.—p. 67.
Clinical Manifestations of Prostatic Disease, with Special Reference to Its Treatment by Transurethral Prostatic Resection. C. S. Paddock, Fayetteville.—p. 70.

Canadian Medical Association Journal, Montreal

47:93-192 (Aug.) 1942

New and Old in War Surgery. E. W. Archibald, Montreal.—p. 93.
Psychoneurones in Wartime. A. T. Mathers, Winnipeg, Man.—p. 103.
Lessons from the Blitz. J. R. LaCroix, Montreal.—p. 112.
Medical Services and the War. R. M. Gorssline, Ottawa, Ont.—p. 116.
Management of the Cancerous Patient Under Radiation Therapy. C. B. Peirce, Montreal.—p. 119.
Use of Testosterone Propionate in Gynecology. Elinor F. E. Black, Winnipeg, Man.—p. 124.
Changing Concepts of Pyelonephritis. W. Boyd, Toronto.—p. 128.
Acute Pneumonitis—Atypical Bronchopneumonia of Virus Origin. J. Markham, Fort William, Ont.—p. 133.
Liver Necrosis Following Burns. J. D. Duffin, Toronto.—p. 138.
Treatment of Fractures of Shaft of Femur. T. A. Robinson, Toronto.—p. 140.
*Meningococcic Infection Treated with Sulfonamide Drugs. D. L. Klein, Montreal.—p. 143.
Preoperative and Postoperative Medication. M. D. Leigh, Montreal.—p. 150.
*Vitamin Therapy of Muscular Dystrophy. W. A. Hawke, Toronto.—p. 153.

Meningococcic Infection Treated with Sulfonamide Drugs.—The all embracing term meningococcic infection is suggested by Klein instead of meningococcic meningitis, as the disease, in addition to the pronounced toxemia, consists of three stages: the initial or nasopharyngeal, the bacteremic and the meningeal. It may become arrested in either of the first two stages, which may account for an increase in carriers preceding and during an outbreak, and meningococcic bacteremia may exist without meningitis for weeks or months or even years. Reports from European centers have shown a definite increase in the incidence of this affliction associated with the present hostilities. The figure for Canada in 1940 was more than double that of 1938 and 1939. The United States of America showed no increase in the notification of this disease. The advent of the sulfonamide compounds has raised the question as to whether serum is required in conjunction with them. Every form of therapy, sulfonamide or serum, acts as an adjunct to the immunity mechanism of the patient under treatment. Sufficient amounts of sulfonamides should be given to relieve the immunity mechanism of as much burden as possible. Low doses are not safe, as too great a burden is thrown on the patient's natural resources with which they may not be able to cope. A large initial dose should be given, because this shortens the total period of treatment. Analysis of a collected series of 41 patients with meningococcic infection from 1937 to the early part of 1941 shows that 2 had meningococcic bacteremia without meningitis and that 39 had meningitis; 6 of them died, giving a gross mortality of 14.6 per cent. The deaths of 5 patients could be eliminated, as they were ill for weeks before treatment was begun, leaving one death in 36 patients, a corrected mortality of 2.7 per cent. Chemotherapy was used alone in the treatment of most of the patients, sulfapyridine more than sulfanilamide. Serum was apparently not essential as an adjunct. Serum should not be administered intrathecally but may be used intravenously or intramuscularly. Therapeutic lumbar punctures are unnecessary when patients are treated adequately and early in the course of the disease.

Vitamin Therapy of Muscular Dystrophy.—Hawke administered moderate amounts of vitamins B_1, B_6 and E to 7 children with muscular dystrophy. In no instance did any definite objective improvement occur.

Cancer Research, Baltimore

2:525-596 (Aug.) 1942

Observations on Mammary Tumor Incidence of Mice Born from Transferred Ova. Elizabeth Fekete and C. C. Little, Bar Harbor, Maine.—p. 525.
Origin of Some Inbred Mice. L. C. Strong, New Haven, Conn.—p. 531.
Observations on Genetics of Susceptibility for Development of Mammary Cancer in Mice. J. J. Bittner, Bar Harbor, Maine.—p. 540.
Irradiation of Transplanted Bagg-Jackson and Yale Carcinomas in Mice as Affected by Diet and Foster Nursing. J. A. Plaut, R. Tennant and A. W. Oughterson, New Haven, Conn.—p. 546.
Morphologic Aspects of Experimental Actinic and Arsenic Carcinomas in Skin of Rats. W. C. Hueper, New York.—p. 551.
Factors Affecting Carcinogenesis: I. Effect of Lipoid Solvents on Tumor Production by 3,4-Benzpyrene. P. Dickens and H. Weil-Malherbe, Newcastle-on-Tyne, England.—p. 560.
Studies in Esterase (Butyric) Activity: I. Esterase Content of Serum of Mice from Certain Cancer Resistant and Cancer Susceptible Strains. V. R. Khanolkar and R. G. Chitre, Bombay, India.—p. 567.
Spontaneous Recovery from Sarcoma in Castrated Adult and in Sexually Immature Mice. L. Gross, Cincinnati.—p. 571.
Complement Fixing Antibodies (Brown-Pearce Carcinoma) in Blood Serum and in Aqueous Fluid of Anterior Chamber of Eye. M. Appel, O. Saphir, Martha Janota and A. A. Strauss, Chicago.—p. 576.

Illinois Medical Journal, Chicago

82:105-176 (Aug.) 1942

Cancer Control in Illinois. R. V. Brokaw, Springfield.—p. 118.
Esophageal Diverticulum. A. E. Mahle and F. Christopher, Evanston.—p. 124.
Vasomotor Rhinitis: Physiologic and Pathogenetic Basis for Therapy. L. Z. Fishman, Chicago.—p. 128.
Rationale of Intravenous Fluid Therapy. A. J. Rotondi, Chicago.—p. 134.
Osteochondrosarcoma of Breast. S. J. Sullivan, Chicago.—p. 140.
Tetracaine Spinal Anesthesia: Review of 100 Cases in Private Practice. S. W. Ramond, Oak Park.—p. 141.
Hepatomegaly and Ascites in Undulant Fever. E. A. Zaus and H. S. Espey, Chicago.—p. 144.
*Treatment of Hypertension with Potassium Sulfocyanate. E. W. Cannady and H. N. Allen, East St. Louis.—p. 146.
Dimenformon Benzoate in Treatment of Ovarian Deficiency. C. J. Weigel, River Forest.—p. 153.
Imperforate Hymen. J. L. Deuterman and S. L. Gabby, Elgin.—p. 161.
Present Status of Practical Endocrine Therapy. S. C. Freed, Chicago.—p. 165.

Potassium Thiocyanate in Hypertension.—Cannady and Allen attempted to determine whether the thiocyanates could be used safely and effectively in the treatment of 19 private unselected hypertensive patients. Their systolic pressure had remained above 200 mm. and their diastolic pressure above 120 mm. on theobromine, nitrate or sedative therapy for three months to three years. During treatment the patients were seen at regular intervals and were questioned for any toxic symptoms. The blood thiocyanate level was determined at regular intervals. Five of the patients had severe renal damage. The result was considered excellent when the systolic pressure fell to 170 mm. or less with a corresponding fall in diastolic

pressure, good when there was some decrease in blood pressure and poor if no fall occurred. The results were excellent with 10, good with 2 and poor with 7 patients. The poor results with 5 of the 7 patients were for those with severe renal damage. Although 3 of this group had a significant fall in blood pressure, they were not symptomatically improved. These 5 patients have died, the cause of death being uremia in 3 instances and cerebral hemorrhage in 2. Their deaths could not be attributed to the thiocyanate, as it was discontinued many months before death. Satisfactory symptomatic and blood pressure improvement was maintained with a thiocyanate blood level of 5 to 12 mg. per hundred cubic centimeters. The amount of potassium thiocyanate necessary to maintain a satisfactory level varied with each patient. The maximal daily dose was 1 Gm. The authors believe that the drug should be discontinued if no improvement occurs with a satisfactory blood thiocyanate level and should not be used for patients more than 60. No other form of therapy has proved successful for elderly patients. The drug should never be used unless frequent blood thiocyanate determinations are made.

Journal of Experimental Medicine, New York

76:127-220 (Aug.) 1942

Studies in Rodent Poliomyelitis: V. Interference Between Murine and Monkey Poliomyelitis Virus. C. W. Jungeblut and M. Sanders, New York.—p. 127.
Hepatic Vitamin A in Rat as Affected by Administration of Dibenzanthracene. J. C. Abels, Alice T. Gorham, Shirley L. Eberlin, R. Halter and C. P. Rhoads, New York.—p. 143.
Constituents of Elementary Bodies of Vaccinia: VI. Studies on Nature of Enzymes Associated with Purified Virus. C. L. Hoagland, S. M. Ward, J. E. Smadel and T. M. Rivers, New York.—p. 163.
Reaction Between the Enzyme Tyrosinase and Its Specific Antibody. M. H. Adams, New York.—p. 175.
Nonvirulent, Single Dose Rabies Vaccine for Prophylactic Immunization of Dogs. L. T. Webster and J. Casals, New York.—p. 185.
Adsorption of Influenza Hemagglutinins and Virus by Red Blood Cells. G. K. Hirst, New York.—p. 195.
Manufacture of Antibodies in Vitro. L. Pauling and D. H. Campbell, Pasadena, Calif.—p. 211.

Journal of Immunology, Baltimore

44:175-270 (July) 1942

Use of Continuous Intravenous Administration of Hypotonic Sodium Chloride (Retan) Treatment in Acute Experimental Poliomyelitis in Monkeys. S. D. Kramer, H. A. Geer and A. T. Himes, Lansing, Mich.—p. 175.
Active Immunity to Microbacterium Multiforme Psittacosis in Mouse. H. Y. Yanamura and K. F. Meyer, San Francisco.—p. 195.
Active Immunization to Microbacterium Multiforme Psittacosis in Parrakeets and Ricebirds. K. F. Meyer, B. Eddie and H. Yanamura, San Francisco.—p. 211.
Influence of Ethylenediamine Derivative on Histamine Intoxication and Anaphylactic Shock in Intact Guinea Pig and Isolated Guinea Pig Heart. H. B. Wilcox Jr. and Beatrice Carrier Seegal, New York.—p. 219.
Demonstration of Antigenic Differences Between Different Strains of Influenza B. I. Gordon, New York.—p. 231.
Spinal Cord Section and Hemolysin Production in Rat. A. H. Stanton, New York; Louise Meunning; Lenore M. Kopeloff, New York, and N. Kopeloff.—p. 237.
Effect of Body Temperature on Hemolysin Production in Rat. Lenore M. Kopeloff and A. H. Stanton, New York.—p. 247.
*Weil-Felix Reaction in Patients with Proteus and Pseudomonas Aeruginosa Infections. G. J. Dammin and F. T. Billings Jr.—p. 251.
Species Specific Precipitins in Serum Sickness After Intravenous Injection of Refined, Concentrated Antipneumococcus Rabbit Serum. P. F. deGara and J. G. M. Bullowa, New York.—p. 259.
Schultz-Dale Studies with Intestinal Strips of Passively and Actively Sensitized Rhesus Monkeys. M. M. Albert and M. Walzer, Brooklyn.—p. 263.

Weil-Felix Reaction and Proteus and Pseudomonas Aeruginosa Infection.—The observation that some patients with infection caused by a member of the genus Proteus showed positive Weil-Felix reactions prompted Dammin and Billings to test the serums of 14 patients from whom either the Proteus mirabilis or the Proteus vulgaris strain was isolated. In 1, Pseudomonas aeruginosa also was recovered. The organism cultured from each is not assumed to have played a major role in causing or determining the course of the patient's illness. Only the serums of those patients in which appreciable agglutinative titers developed to their own organisms showed agglutinins in significant titer for the Weil-Felix antigens. It was particularly those patients in whom agglutinins developed to an O antigen prepared from the organism isolated from them that significant titers for the Weil-Felix antigens developed. In an attempt to detect the probable presence of an antigenic component common to the Weil-Felix strains and those isolated from the patients, it was found that a minor antigen is common to human strains of Proteus and Pseudomonas aeruginosa and to the X strains of Proteus routinely employed in the Weil-Felix test. The existence of this antigen explains the positive Weil-Felix reactions exhibited by patients infected with Proteus and Pseudomonas aeruginosa. When tested with the Weil-Felix antigens, the serums of these patients show an agglutinative pattern different from that in the rickettsial diseases. The study indicates that the strains of Proteus isolated from patients are most closely related antigenically to Proteus OXK.

Journal of the Mount Sinai Hospital, New York

9:63-126 (July-Aug.) 1942

New Aspects of Pulmonary Tuberculosis and Their Relation to Treatment. E. Mayer and I. Rappaport, New York.—p. 65.
*Radiation Cancer. S. M. Silverstone, New York.—p. 74.
Sarcoma of Neck Following Roentgen Therapy in Graves' Disease. E. E. Arnheim, New York.—p. 84.
Unusual Epithelioma of Leg. O. L. Levin and H. T. Behrman, New York.—p. 87.
Abscess of Frontal Lobe Secondary to Frontal Sinusitis: Operation and Recovery. L. Kleinfeld, New York.—p. 96.
Giant Hyperplasia of Gums from Dilantin Sodium. L. Stern and L. Eisenbud, New York.—p. 100.

Radiation Cancer.—Radiation cancer develops in three groups of persons: those who work with roentgen rays and radioactive elements, those on whom roentgen rays or radium is used during a long time for diagnostic or therapeutic purposes and industrial workers who come in contact with radioactive elements. The exact amount or dose of radiation necessary to produce radiation cancer, Silverstone points out, is not known, nor is it as important as the fact that the radiation must be administered over a long continuous exposure or many intermittent exposures. Radiation in doses sufficient to destroy diseased tissue completely produces radionecrosis, and radionecrotic tissue seldom undergoes malignant change; but cancer may occur in the viable tissue at the edge of the radionecrotic area. If the dose produces incomplete destruction or differential destructive effects on various tissue components, a complex balance of necrosis and repair is set up which may eventually lead to malignant neoplastic formation. In such an injury, degenerative and regenerative processes are operative at the same time. Both processes are progressive and continue indefinitely even though the radioactive agent is withdrawn. This stage corresponds to the long latent unpredictable and variable period between their radiation and the appearance of a neoplasm. It may vary from one to twenty-five years, during which time both reparative and degenerative processes are active but neither repair nor necrosis is ever complete. Finally a stage is reached in which the reparative processes undergo increased activity and a transition to neoplastic activity, frequently multiple, occurs. These events are best observed in the skin; every stage of transition may be found from simple hyperplasia of the epithelium to infiltrating squamous cell carcinoma but in a stroma characterized by extensive hyalinization and poor vascularity. The type of neoplasm depends not on the nature of the injurious agent but on the type of tissue affected. The origin of the neoplasm is limited to the irradiated tissue, but, once established, it behaves like any other malignant neoplasm of similar structure and anatomic site.

Kentucky Medical Journal, Bowling Green

40:293-338 (Aug.) 1942

First Aid Treatment of Fracture Patients. W. M. Ewing, Louisville.—p. 296.
Treatment of Fractures of Jaw. E. C. Hume, Louisville.—p. 297.
Colles' Fracture. O. R. Miller, Louisville.—p. 298.
Pott's Fracture. R. O. Joplin, Louisville.—p. 300.
Nailing of Fractures of Neck of Femur. B. B. Baughman, Frankfort.—p. 303.
Rheumatoid Arthritis. G. S. Butterff, Louisville.—p. 309.
Chemotherapy in Pneumonia. A. McMahon, St. Louis.—p. 315.
Cancer Cell. R. A. Bate, Louisville.—p. 331.

Laryngoscope, St. Louis

52:507-592 (July) 1942

Actinomycosis of Temporal Bone. J. M. Brown, Los Angeles.—p. 507.
Ossiculectomy in Treatment of Chronic Suppurative Otitis Media. F. T. Hill, Waterville, Maine.—p. 514.
Roentgenography of Sphenoid Sinus. J. C. Peele and F. E. LeJeune, New Orleans.—p. 522.
Essential Procedures in Diagnosis of Abnormalities of Hearing, with Some Audiometric Findings. E. S. Connell and B. C. Trowbridge, Kansas City, Mo.—p. 545.
Cysts of Tonsillar Fossae Following Tonsillectomy. R. Harris, Jackson, Miss.—p. 557.
Primary Carcinoma of Epiglottis: Case Report. D. Ide, New York.—p. 561.
Lateral Sinus Thrombosis: Case Reports. C. D. Blassingame, Memphis, Tenn.—p. 569.
Residual Hearing. C. S. Nash, Rochester, N. Y.—p. 577.

Maine Medical Association Journal, Portland

33:175-196 (Aug.) 1942

An Old Fashioned Medical School. W. E. Tobie, Portland.—p. 175.
Mortality in Acute Appendicitis: Analysis of 615 Cases in Small Community Hospital. H. Brinkman, Farmington.—p. 180.
*Henoch's Idiopathic Purpura. H. G. Hadley, Washington, D. C.—p. 184.

Henoch's Idiopathic Purpura.—When cutaneous hemorrhage is combined with colic it is Henoch's purpura which is related to various erythemas, urticaria and angioneurotic edema. The condition, Hadley points out, may occur with or without purpura, and when purpura is absent many patients have undergone surgical operations for supposed appendicitis. The abdominal symptoms are colicky in type and are due to internal hemorrhages and to intestinal swelling and distention. There is edema in many cases around the face, hands and feet. The symptoms are anaphylactoid. The disease not only may simulate abdominal disease but may cause it. Vitamin C treatment does not produce any definite clinical results.

New England Journal of Medicine, Boston

227:203-240 (Aug. 6) 1942

Impact of War on Venereal Disease Program. R. A. Vonderlehr, Washington, D. C.—p. 203.
Massachusetts Public Health Problems in Wartime. P. J. Jakmauh, Boston.—p. 206.
Industrial Health and the War. D. L. Lynch, Boston.—p. 209.
Robert Burton and His Drugs: The Armamentarium of 1600. C. S. Leonard, Burlington, Vt.—p. 216.
Nutrition: Appearance of Tongue as Index of Nutritional Deficiency. H. Jeghers, Boston.—p. 221.

New Orleans Medical and Surgical Journal

95:53-98 (Aug.) 1942

*Typhus Fever in Charity Hospital. C. Joseph, New Orleans.—p. 53.
Cephalin Cholesterol Flocculation as Liver Function Test. E. H. Lawson and H. T. Engelhardt, New Orleans.—p. 60.
Primary Thrombosis of Axillary Vein. M. DeBakey, A. Ochsner and M. C. Smith, New Orleans.—p. 62.
Health Protection of Civilians in Present War: Nutrition. J. H. Musser, New Orleans.—p. 70.
Id.: Emergency Water Supply and Sewage Disposal. J. H. O'Neill, New Orleans.—p. 73.
Id.: Potential Epidemics in Louisiana. E. C. Faust, New Orleans.—p. 77.
Id.: Prevention of Communicable Diseases Under War Conditions, with Especial Reference to Immunization. G. W. McCoy, New Orleans.—p. 79.
Id.: Defense of Children. Emma H. B. Wharton, New Orleans.—p. 85.

Typhus.—Joseph states that there is no epidemic typhus in the United States today but that endemic typhus is present and is becoming more widespread and frequent. Endemic or murine typhus is primarily a disease of rats and is transmitted only incidentally from rat to man by the tropical rat flea, never as far as is known from one human being to another. It can and does occur in all classes and not as the epidemic, only in the lower economic strata. This is the form seen at Charity Hospital. Mild typhus was not described as occurring in Louisiana until 1929. Only 130 cases were reported in Louisiana during the following ten years. In 1939 117 cases were reported, in 1940 118 cases and in 1941 194 cases. During 1941 there were almost 3,000 cases in the United States and of these 94 per cent were reported from the coastal southeastern United States and Texas. Of the 194 cases in Louisiana, 44 were observed at Charity Hospital. In nearly every case there was a definite history of having rats in the home or working environment, or both. Of the 44 patients 24 had actually handled rats or mice or had a history of having had flea or other insect bites. Blood serum agglutination of suspensions of Bacillus proteus OX19 developed in all the patients. The disease appeared most often in urban environments and in late summer and early fall. Although there is no specific treatment, there were no deaths and the complications and sequelae were negligible. Sulfonamides and quinine were used without beneficial effect. A vaccine for immunization is to be had, but as far as endemic typhus is concerned rat control is the only prevention.

Ohio State Medical Journal, Columbus

38:717-796 (Aug.) 1942

Emotional Reactions Created by the War. W. C. Menninger, Topeka, Kan.—p. 733.
Treatment of Acute Craniocerebral Injuries. E. W. Shannon, Cleveland.—p. 744.
Transverse Abdominal Incisions. R. D. Mansfield, Canton, and R. Lich Jr., Pittsburgh.—p. 749.
Endometrial Biopsy in the Diagnosis of Unruptured Tubal Pregnancy. W. M. Silbernagel, R. S. Fidler and O. P. Burt, Columbus.—p. 751.
Treatment of Psoriasis. C. L. Cummer, Cleveland.—p. 754.
Unguentum Aluminii Stearatis. M. H. Fischer, Cincinnati, and H. Lowell, Hamilton.—p. 756.
Tuberous Sclerosis. H. N. Reback, Cuyahoga Falls.—p. 757.
Interstitial Keratitis as Sign of Congenital Syphilis: Report of Two Cases. L. C. Ravin, Toledo.—p. 760.

Pennsylvania Medical Journal, Harrisburg

45:1153-1248 (Aug.) 1942

Surgical Treatment of Glaucoma. W. L. Benedict, Rochester, Minn.—p. 1167.
Recent Studies in Epilepsy. H. D. Palmer and J. Hughes, Philadelphia.—p. 1173.
Goiter After Forty. V. G. Burden, Philadelphia.—p. 1178.
Simultaneous Multiple Primary Malignant Tumors. B. Z. Cashman and M. Cohen, Pittsburgh.—p. 1183.
*Arterial Hypotension. T. M. Durant, Philadelphia.—p. 1188.

Arterial Hypotension.—Durant limits his discussion to the so-called essential hypotension and postural hypotension. Arterial hypotension is not a disease entity. The relationship of low blood pressure to lassitude, dizziness, headache, lack of stamina, nervousness and cold extremities must be considered. Yet persons with hypotension do not all have these complaints. Therefore the problem must be analyzed still further to discover, if possible, why some persons with hypotension complain bitterly whereas others do not. The one striking feature of the hypotensive person with symptoms is that he is, characteristically, of linear build, is usually underweight, is often of sedentary habits, partakes of little exercise and frequently manifests nervous instability and has habitual hypothermia. The question is whether the symptomatology is due to the hypotension or to the constitutional makeup and physical condition. There is evidence that it is possible to alleviate completely the symptoms of most of these patients by correcting the weight deficiency by persistent graduated exercises and dietary measures. The symptoms disappear even though the blood pressure remains unaltered. Drugs which raise the blood pressure without psychic stimulation do not completely relieve the complaints even when the pressure becomes average. Therefore the hypotension is not the primary factor in the symptomatology but a symptom of subnormal body tonus. The hypotensive individual without complaints is generally in good physical trim whose circulatory adjustments (as in the athlete) have been developed to the highest plane of efficiency. Therefore "essential" hypotension is not of itself a disease, but in the undernourished asthenic individual complaining of fatigue and related symptoms it should direct attention to the treatment of the general condition. The relationship of blood pressure to posture is close. There are persons who often have a normal blood pressure when examined, but if the determination is made after they have stood several minutes the result will be entirely different. The ability of a subject to maintain the upright position without circulatory embarrassment is directly related to the level of muscle tonus. Other factors which may greatly influence the adaptive mechanisms and thus contribute to orthostatic hypotension are nervous fatigue, the postinfectional convalescent state, pregnancy and disease of the central nervous system. The patient with postural hypotension generally complains of syncope, dizziness or dim-

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ness of vision. The relationship to posture may or may not be volunteered. Careful questioning reveals that these symptoms are at their worst in the early morning or in hot weather. In addition to these manifestations deficiency of the sweating mechanism and polyuria in the recumbent position are often present. The determination of the pulse rate and blood pressure up to eight minutes should never be neglected when postural hypotension is suspected, and whenever possible the examination should be done in the morning and in the standing position. Rational treatment demands appropriate treatment of any organic disease of the nervous system if present; if no such disease is found, the treatment may be medicinal and nonmedicinal. The most effective medicinal agents are the vasoconstrictors, but their effect is only palliative, and they must be used indefinitely unless nonmedicinal measures are successfully employed. Also some patients acquire a tolerance and their use in the elderly with vascular disease is dangerous. Such a patient should be warned against standing immobile for any length of time, but if necessary he should rise up on his toes from time to time to propel more blood from the lower extremities. Properly fitted abdominal supports are sometimes beneficial. The "head-up" position when sleeping lessens the loss of the adaptive mechanisms gained during the daytime. Dietary measures and graduated exercise warrant a routine trial in all cases.

Surgery, St. Louis

12:163-344 (Aug.) 1942

*Application of Phlebography to Therapy of Thrombosis and Embolism. C. E. Welch, H. H. Faxon and C. E. McGahey, Boston.—p. 163.
Thrombosis of Axillary Vein. T. Kaplan, New York.—p. 184.
Review of Studies on Water and Electrolyte Balance in Surgical Patients. F. A. Coller, Ann Arbor, Mich.—p. 192.
Modified Whipple Operation for Carcinoma of Head of Pancreas. C. Dennis, Minneapolis.—p. 201.
Problems with Duodenal Stump in Gastric Resections. R. W. McNealy, Chicago.—p. 207.
Benign Tumors of Stomach. E. M. Finesilver, New York.—p. 216.
Experimental Prevention of Intraperitoneal Adhesions with Heparin: Third Report. E. P. Lehman and F. Boys, Charlottesville, Va.—p. 236.
Effect of Therapeutic Blood Levels of Sulfanilamide and Sulfadiazine on Wound Healing. H. A. Zintel, D. B. Freshwater, J. D. Hardy, W. M. Harris Jr., C. S. Neer 2d and S. W. Robinson, Philadelphia.—p. 242.
Study of Physical Factors Concerned in Inflammation: I. Role of Hydrostatic and Physicochemical Forces in Establishment of Certain Equilibriums. C. J. Bellis, Springfield, Mo.—p. 253.
*Resuscitation in Advanced Asphyxia: Role of Positive and Negative Pressure. S. A. Thompson and G. L. Birnbaum, with technical collaboration of E. Ostrow, New York.—p. 284.
Italian Method of Plastic Repair of Denuded Areas Followed by Mermaid Cast Immobilization. F. G. Murphy, Chicago.—p. 294.
Effect of Low Blood Pressure on Capillary Permeability and Inflammation in Skin of Rabbits. R. H. Rigdon, R. M. Miles and R. P. Bland, Memphis, Tenn.—p. 302.
Consideration of Contraindications for Radical Operation in Cancer of Rectum. V. C. David and R. K. Gilchrist, Chicago.—p. 310.

Phlebography and Thrombosis and Embolism.—Welch and his co-workers state that the phlebogram is not absolutely reliable for the diagnosis of thrombosis. There are many cases in which a leg appears clinically normal, while the phlebogram will show a deep thrombosis. However, if clinical signs suggest thrombosis but the phlebogram is indeterminate or negative, thrombosis should be considered to be present and adequate therapy instituted. In general, phlebograms are valuable in any case of known or suspected thrombosis of the veins of the lower leg or after a pulmonary infarct has occurred, unless it arose elsewhere than from the leg. As thrombosis is frequently bilateral, many patients will require bilateral procedures. Superficial thrombophlebitis constitutes a special indication, as involvement of the deep system is common in conjunction with thrombosis of the saphenous vein. Systemic manifestations have not occurred after the injection of the 50 cc. of diodrast required for bilateral phlebograms. A contraindication to a phlebogram is sepsis about the ankle. The therapy of venous thrombosis is ligation. Eighty-two femoral veins have been ligated for deep venous thrombosis. Ligation is done for any patient who is 40 or more years of age or, if less than 40, when he has a bland thrombosis or a pulmonary infarct. According to control figures, it should have been expected that about 25 patients would have had further pulmonary infarcts, while 6 would have died if conservative therapy had been employed. However, only two nonfatal infarcts ensued. Bilateral ligations were done nine times. The site of ligation is important. The vein should be ligated below a large branch to avoid a long static column of blood with potential thrombosis and fatal embolism. Ligatures may be placed on the superficial femoral, common femoral or iliac vessels. Extra dissection required for iliac ligation was avoided by using suction to withdraw thrombi from higher levels. It is advisable to ligate above the thrombosis if possible; if not, over the thrombus using a suction apparatus to extract the clot.

Resuscitation in Advanced Asphyxia.—Advanced asphyxia (cessation of respiration) in dogs was produced by Thompson and Birnbaum by mechanical obstruction of a face mask, obstruction of an intratracheal tube or inhalation of inert gases. The degree of success of the four resuscitation procedures carried out were manual artificial respiration with inhalation of oxygen in 55 per cent, rhythmic inflation with oxygen in 78 per cent, rhythmic suction with oxygen in 80 per cent and rhythmic inflation and suction in 95 per cent.

Western J. Surg., Obst. & Gynecology, Portland, Ore.

50:371-432 (Aug.) 1942

*Some Interrelationships of Pituitary Gland and Thyroid. Aura E. Severinghaus, New York.—p. 371.
Gonadotropins. L. M. Randall, Rochester, Minn.—p. 382.
Obstetric Shock and Hemorrhage: Use of Blood and Blood Substitutes in Shock and Hemorrhage. S. O. Levinson, Chicago.—p. 388.
Id.: Adjuvant Secondary Shock Therapy. S. C. Cullen, Iowa City.—p. 392.
Id.: Shock and Hemorrhage in Obstetrics and Gynecology. E. D. Plass, Iowa City.—p. 396.
Blood Coagulation and Hemostasis. C. V. Moore, St. Louis.—p. 402.
Current Methods for Estimating Prothrombin. E. D. Warner, Iowa City.—p. 408.
History of Pharmacology of Sulfonamides. A. E. Brown, Rochester, Minn.—p. 416.
Surgical Consideration of Lesions of Stomach and Duodenum. V. C. Hunt, Los Angeles.—p. 424.

Interrelationships of Pituitary Gland and Thyroid.—Severinghaus points out that the clinical manifestations of hypothyroidism which are seen in myxedema, pituitary cachexia and anorexia nervosa which involve pituitary and thyroid deficiencies can be separated only by extensive laboratory studies. Yet on physical examination by competent diagnosticians the symptoms are often indistinguishable. Laboratory methods show that the total chemical and physiologic processes of individuals with Simmond's disease differ from those suffering from anorexia nervosa or primary myxedema. Thyroid therapy which dramatically improves the myxedematous condition may cause total collapse and death in the syndromes whose primary lesions are in the pituitary gland. These syndromes are difficult to differentiate because of their close pituitary-thyroid interrelationship. A primary lesion in the thyroid will induce pathologic changes in the pituitary, which in turn will be reflected on the entire endocrine system. Thus what started out to be a thyroid deficiency may finally become a pluriglandular syndrome closely resembling total failure of the pituitary gland. One syndrome may merge into another. When a preparation that approaches in value preparations from the thyroid is obtained from the pituitary, many of the perplexing problems of the thyroid-pituitary interrelationship may vanish, at least for the clinician.

West Virginia Medical Journal, Charleston

38:277-328 (Aug.) 1942

War and Medical Trends. R. O. Rogers, Bluefield.—p. 277.
Diabetes and Its Complications. J. H. Barach, Pittsburgh.—p. 283.
Hidrosadenitis Suppurativa Axillaris. C. H. Engelfried and L. E. Nolan, Montgomery.—p. 293.
Procurement and Assignment Service. E. L. Henderson, Louisville Ky.—p. 296.

Wisconsin Medical Journal, Madison

41:643-742 (Aug.) 1942

Fractures of Spine. F. A. Chandler, Chicago.—p. 655.
Fractures of Extremities. H. C. Schumm, Milwaukee.—p. 658.
Fractures of Os Calcis. J. O. Dieterle, Milwaukee.—p. 662.
Transport and First Aid of Accident Cases. J. M. King, Milwaukee.—p. 666.
Problems in Diagnosis of Brain Tumors: Report of Case. J. Pessin, Madison.—p. 669.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

Archives of Disease of Childhood, London

17:65-110 (June) 1942

Secretion of Urine by Dehydrated and Normal Infants. W. F. Young and R. A. McCance, with technical assistance from E. Finch.—p. 65.
Peptic Ulcer in Infancy and Childhood: Review of Literature. Katharine J. Guthrie.—p. 82.
Duodenal Ulceration in Children: Two Cases. A. W. Franklin.—p. 95.
Duodenal Ulceration in Children Simulating Acute Appendicitis: Four Cases. D. G. W. Clyne and J. Rabinowitch.—p. 102.

British Medical Journal, London

2:31-60 (July 11) 1942

*Megaloblastic Anemia of Pregnancy and Puerperium. L. S. P. Davidson, L. J. Davis and J. Innes.—p. 31.
Asphyxia Following Dental Extraction in Hemophiliac, with Note on Spread of Infection in Ludwig's Angina. C. L. Endicott, J. H. Mitchell and G. Qvist.—p. 34.
Insulin Hypoglycemic Coma: Report of Two Fatal Cases. E. H. Roche.—p. 35.
*Human Isoagglutinin Anti M: Case. J. L. H. Paterson, R. R. Race and G. L. Taylor.—p. 37
*Further Data Concerning Human Fertility. G. P. Smith.—p. 38.

Megaloblastic Anemia of Pregnancy and Puerperium.—In Edinburgh during the last two years Davidson and his associates had 16 cases of megaloblastic anemia of pregnancy referred to them. Seven were seen prior to the use of liver therapy, but in the remaining 9 such treatment had been used for two days to two months before the authors were called into consultation. The ages, 23 to 41, were considerably lower than those common in addisonian pernicious anemia. That pernicious anemia of pregnancy occurs mainly in women who have borne several children is not supported by the authors' experience, as 8 of the patients were in their first or second pregnancy. Only 2 patients were seen by them before delivery, but examination of the case records revealed a history of pronounced pallor and dyspnea during pregnancy in 13. In the 8 for whom hemoglobin figures were available they ranged from 18 to 52 per cent and more detailed hematologic data available for 4 indicated a severe anemia of the pernicious type. The anemia became progressively more severe during the last two months of pregnancy. The features serving to differentiate many of the cases from addisonian pernicious anemia were free hydrochloric acid and a lower frequency and degree of macrocytosis and ovalocytosis. Examination of the sternal marrow before and after liver therapy revealed with 1 exception a picture identical with that found in addisonian pernicious anemia at equivalent stages and clearly indicated that these anemias have for their immediate cause arrested maturation of the megaloblasts. Accordingly "megaloblastic anemia of pregnancy" is proposed as a substitute for the misleading name "pernicious anemia of pregnancy" on the grounds that the megaloblastic appearance of the bone marrow is characteristic and constant, while the peripheral blood changes are variable. The most acceptable explanation of the anemia is that the primary cause lies in a temporary failure of the gastric secretion of the intrinsic factor of Castle during the later months of pregnancy. Other factors held to be important are a reduced intake of the extrinsic factor, impaired absorption from the small intestine and increased demands by the fetus for the hematinic principles. Ten of the patients were refractory to liver treatment for some time, but with persistent therapy and transfusions they eventually responded. This failure suggests a temporary arrest of erythropoietic function consequent on the absence of some essential factor in addition to the liver principle. A similar state of affairs frequently occurs in sprue. An alternative hypothesis is functional inability of the bone marrow to utilize the various hematinic principles because of the profound strain of pregnancy and the shock of labor occurring in a severely anemic patient. Sepsis probably delayed the response of 6 patients to liver therapy.

Human Isoagglutinin Anti M.—Recently, as a result of testing against the erythrocytes of potential donors the serum of a woman who might have needed a transfusion during parturition, Paterson and his associates discovered an antibody, apparently anti M. No transfusion was given. The woman was 28 years of age and pregnant for the fourth time. Her blood group was ON and she was Rh positive. Serum obtained from her four months after her confinement was tested against the erythrocytes of 20 persons belonging to group O. Undoubted and clearcut agglutination was found in fourteen of the mixtures; all contained the agglutinogen M. The six mixtures with no agglutination belonged to group ON and so lacked the antigen M. Although such an occurrence must be exceedingly rare, the case reported shows that its presence may interfere with the selection of suitable blood for a person in whose serum this antibody appears.

Human Fertility.—Smith presents data which support the following hypotheses regarding human fertility: (1) If fertilization does not occur, menstruation follows approximately fifteen days after ovulation; (2) within limits there is a "safe" or infertile period a few days before the onset of the next menstrual cycle, and (3) an average "safe period" can be predicted with fair accuracy by a sufficiently extended study of the individual's menstrual periodicity. Records of uncontraceptive coitus during thirty-one infertile cycles show that there were occasions when it took place as much as thirteen days before the beginning of the next cycle without ensuing pregnancy. Coitus which took place on the ninth, tenth and thirteenth to sixteenth days after the beginning of a cycle was followed by pregnancy. Prediction of the narrower limits of the fertile period of an individual can be made only by counting back from the beginning of the next cycle. Only the wider limits of the fertile period can be predicted by counting from the beginning of the same cycle; this requires a knowledge of the variation of menstrual periodicity.

Lancet, London

1:755-782 (June 27) 1942

Filter Cloth for Controlling Smell from Plasters. H. J. Seddon and H. W. Florey.—p. 755.
Plea for Wartime Use of Cotton Ligatures. C. A. Punnett.—p. 756.
Infantile Beriberi and Beriberi Heart. H. S. Stannus.—p. 756.
Basal Narcosis for Tonsil Operations on Children. J. Gerrie and J. R. Mackenzie.—p. 759.
Rapid Clinical Method for Estimation of Sulfanilamide. A. T. Fuller, with addendum by L. Colebrook.—p. 760.
Herpes Simplex Virus: Simple Method for Adapting Human Strains to Mice. A. J. Steigman and T. F. M. Scott.—p. 761.
*Sublingual Therapy in Addison's Disease. A. Wilson.—p. 762.

Sublingual Therapy in Addison's Disease.—Wilson reports that the sublingual administration of desoxycorticosterone acetate in propylene glycol failed to maintain 4 patients with Addison's disease in health. He does not believe that this form of therapy, from an economic or any other point of view, has any advantages over the parenteral route.

2:1-28 (July 4) 1942

Chronic Head Cases. C. Anderson.—p. 1.
Giardial Infestation with Steatorrhea. D. K. O'Donovan, J. McGrath and S. J. Boland.—p. 4.
Soluble Phenytoin in Epilepsy. Gladys M. Tullidge and J. T. Fox.—p. 6.
*Extensive Air Screw Injuries. J. Howkins and G. Wooler.—p. 8.

Extensive Air Screw Injuries.—An example of an extensive but nonfatal injury to the thorax that a revolving air screw inflicts is illustrated by the case reported by Howkins and Wooler in an aircraft apprentice of the Royal Air Force. The injury inflicted during the accident consisted of severe injuries of the right arm and laceration of all three lobes of the right lung. The lung was sutured, the chest was closed without drainage and the right arm was disarticulated at the shoulder joint. A massive infection of the right lung and an apical empyema developed; this was drained and the pulmonary condition resolved. The patient recovered completely and is being considered for retention in the service.

Medical Journal of Australia, Sydney

1:649-670 (June 13) 1942

Operative Experiences in Hydronephrosis. R. Flynn.—p. 649.
Postoperative Treatment in Radical Mastoidectomy. R. E. Buckingham.—p. 661.

Revista Argentina de Neurol. y Psiquiat., Rosario

6:69-148 (June) 1941. **Partial Index**

Insulin and Convulsion Therapy in Schizophrenia: Clinical and Medico-legal Aspects. C. Lambruschini.—p. 69.
*Catamnesis of Patients with Dementia Precox Submitted to Insulin Therapy. A. P. Quaranta.—p. 109.

Dementia Precox and Insulin Therapy.—In the course of 1937 Quaranta resorted to insulin therapy in 41 cases of dementia precox of different clinical forms and duration. The latter was six months or less in 16 cases in the first group, one year or less in 12 cases in the second group and more than a year and a half in 17 cases in the third group. There were 17 cases of complete remission in the whole group which corresponded to 10 out of 16 cases in the first group, 3 out of 12 in the second group and 4 out of 17 in the third group. Patients with a complete remission were observed for four years, by the end of which, in 1941, remission lasted in 10 cases. Three patients had recurrences and are again under neuropsychiatric care. Four had recurrences but carry on a life which is compatible with their stay at home. All the 10 patients with permanent remission are in good physical and mental condition and they work. The author advises application of insulin therapy in dementia precox. The earlier the administration of the therapy the better and more certain the results.

Semana Médica, Buenos Aires

49:1013-1072 (May 21) 1942. **Partial Index**

*Mortality in Bronchopneumonia Due to Measles. F. Bazán, E. Sujoy and R. Maggi.—p. 1030.
Glutathionemia in Normal Pregnancy and Puerperium. J. Livio Martini.—p. 1036.
Infantile Paralysis. C. Goldenberg.—p. 1042.

Mortality in Bronchopneumonia Due to Measles.—Bazán and his collaborators observed 33 children from a few weeks after birth to 3 years of age with bronchopneumonia complicating measles. Death from pneumonia took place within the first ten days of the disease. The highest mortality rate was in infants of less than 1 year of age. The majority of children over 3 years of age have recovered. The predominant symptoms of fatal bronchopneumonia due to measles were persistent high fever (over 104.0 F.), acute dyspnea and stridor, subacute cyanosis, progressive decline in the general condition, lack of appetite and acute intoxication. Tachycardia was of equal frequency in children who were cured and in those who died. In the latter it was associated with cardiac failure, which did not exist in the former. The pseudolobar form of pneumonia was found in 75 per cent of the patients who died and in 11 per cent of those who were cured. The lack of favorable response to therapy and to baths, and especially the failure of blood transfusion in improving the patient's condition, constituted important signs of a bad prognosis. As a rule they were not observed in children who were cured. The pathologic anatomy shows not only bronchopulmonary lesions but also multiple lesions, which indicated that the disease is general rather than local. The general condition of the patient before the development of the disease has an influence on the course of the latter. The rate of mortality in bronchopneumonia due to measles is higher for girls than for boys.

Ugeskrift for Læger, Copenhagen

103:1419-1444 (Nov. 6) 1941

*Treatment of Cerebrospinal Syphilis. J. Madsen.—p. 1419.
*Treatment of Cerebrospinal Syphilis. E. Lomholt.—p. 1423.
Results of Malaria Treatment at St. Hans Hospital: Preliminary Report. Margrete Lomholt.—p. 1426.
Early Diagnosis and Treatment of Congenital Dislocation of Hip. M. Winge.—p. 1429.
Treatment of Congenital Dislocation of Hip According to Bauer: Primary Results. M. Winge.—p. 1431.
Vitamin A Requirement in Newborn and Infants. G. Rønne.—p. 1432.
Burn from Ensilage Fluid. K. E. Dinesen.—p. 1434.
Container for Feces Specimens. O. Mølthe.—p. 1435.

Treatment of Cerebrospinal Syphilis.—Madsen says that lumbar puncture should be made in all cases of syphilis after the ended septicemic period or as a rule from three to six years after the infection. Normal spinal fluid in the latent period seems to exclude later neurosyphilis. If changes in the spinal fluid are found in this period, antisyphilitic treatment is justifiable, but if the spinal fluid does not become normal in the course of some months malaria treatment should be instituted. If signs of cerebrospinal syphilis are already present, for example, Argyll Robertson's symptom, a normal spinal fluid does not testify against an active inflammatory process in the nervous system, and in the author's opinion malaria treatment is indicated. A negative Wassermann reaction does not exclude cerebrospinal syphilis. If without demonstrable cause neurasthenic symptoms appear in a previously well man in his prime, the possibility of a beginning paralysis is always to be borne in mind. On the diagnosis of paralysis, malaria treatment as soon as possible is called for, as the duration of the favorable period for treatment is a matter of weeks rather than months. Malaria treatment is regarded as the most effective therapy in dementia paralytica. Four cases treated are reported.

Treatment of Cerebrospinal Syphilis.—Lomholt's view is that all forms of recent syphilis in the primary-secondary stage should be given a powerful combined intermittent treatment. In acute syphilitic meningitis the reaction to the treatment is excellent, and the changes in the spinal fluid in the secondary stage usually quickly yield to it. Until proof is available that powerful antisyphilitic treatment can prevent later occurrence of neurosyphilis, he would consider this hypothesis as correct. The few small materials of sufficiently treated cases to date seem to confirm the hypothesis, he says, and practically all syphilologists of consequence agree that paralysis or tabes is rarely seen in a patient who has had a fully effective treatment of his syphilis according to the present day standard. In latent syphilis with changes in the spinal fluid, in which the age of the infection is often unknown, he recommends immediate malaria treatment. To what extent malaria treatment can prevent the occurrence of tabes and paralysis is not certain, because no materials have been observed sufficiently long, but he has not seen any case of tabes or paralysis after malaria treatment of syphilis in the latent stage.

103:1523-1554 (Nov. 27) 1941

*Deficiency in Plasma Prothrombin and Vitamin K in Hepatic Diseases: Vitamin K Deficiency in Pancreatic Diseases and in Diarrheas. P. Bechgaard.—p. 1523.
*Gastrointestinal Symptoms in Tumors of Brain. H. E. Nielsen.—p. 1530.
Mortality from Burns. Ellen Keller Sørensen.—p. 1534.
Dolantin in Obstinate Hiccups. H. Jessen.—p. 1537.
Neuralgia Paresthetica Treated Operatively. M. Ellermann.—p. 1537.

Plasma Prothrombin and Vitamin K in Hepatic Diseases.—Bechgaard recommends Quick's method for determination of the prothrombin content of the blood (Lehmann's modification) as easy and reliable for clinical use. Examination by this procedure in 26 cases of liver and biliary tract disorder, he says, showed definite prothrombin reduction in 14. Prothrombin deficiency often occurs in acute hepatitis, cirrhosis of the liver and extensive metastases in the liver, the amount of decrease usually being small (to about 50 per cent); in these cases treatment with vitamin K is not indicated. In grave cases of hepatitis with long-continued acholic feces and during bad periods in cirrhosis a pronounced decrease in the prothrombin content is seen; here vitamin K is indicated, preferably carried out on the basis of determination of the prothrombin content. In cases of bleeding esophageal varices and in all cases of hemorrhage during jaundice it is especially important to determine whether vitamin K deficiency is a contributing cause and to try the effect of treatment with vitamin K.

Gastrointestinal Symptoms in Tumors of Brain.—Nielsen found that in 8 out of 25 cases of verified brain tumor gastrointestinal symptoms were the first signs of the brain disorder and dominated the picture until the diagnosis of brain tumor was made. He divides the cases into a dyspepsia group, in which the symptoms are more indefinite, and an ulcer group, in which there are more or less well defined ulcer symptoms. The gastrointestinal symptoms do not afford an indication of the localization of the brain tumor, although most of the tumors had a near relation to the fourth ventricle. Concerning the relation between gastrointestinal ulcer and tumor of the brain, the importance of the neurogenic factor in ulcer pathogenesis in general is emphasized.

Book Notices

The National Formulary. National Formulary VII. Prepared by the Committee on National Formulary by authority of the American Pharmaceutical Association. Official from November 1, 1942. Seventh edition. Fabrikoid. Price, $6. Pp. 690. Washington, D. C.: American Pharmaceutical Association, 1942.

The purpose of the National Formulary is to supply formulas for preparations that are in fairly common use within the United States or its possessions and for which formulas are not included in the Pharmacopeia of the United States; also to provide standards and tests for the identity, quality and purity of the ingredients used in these formulas and for certain other agents enjoying common use.

The seventh edition of the National Formulary contains 459 preparation monographs and 273 monographs on drugs and chemicals. Of these, 97 are new to the National Formulary; among the latter are 71 monographs from U. S. P. XI. The total number of monographs in N. F. VI not admitted to N. F. VII is 51, of which 40 were deleted by reason of their adoption for admission to U. S. P. XII. In addition to improvements in editorial style of the monographs, the National Formulary VII contains an expanded chapter on materials and preparations for diagnostic use and a new chapter on ingredients of reagents and preparations for use in the clinical laboratory. The index, as always, is complete.

This volume, which becomes official on November 1, represents the passage of fifty-four years since the first edition appeared in 1888. In each revision there has been an indisputable improvement over its predecessor. The contents of this official organ of the American Pharmaceutical Association follow a style familiar to an untold number of students and followers in a variety of scientific fields, and it would be trite to enumerate the chapters. It would be equally banal to attempt to emphasize the information on reagents, tests and standards which may be found between the covers of this work, but it is impossible to forego the opportunity of saying that this compendium, because of its contents and because of its official nature, should be a "must" in every scientific library, private or otherwise, which is purported to be even moderately up to date.

Chemistry and Physiology of the Vitamins. By H. R. Rosenberg, Sc.D. Cloth. Price, $12. Pp. 674, with 25 illustrations. New York: Interscience Publishers, Inc., 1942.

This monograph is an encyclopedic presentation of the chemistry of the vitamins. The book is well organized and therefore convenient to use. Each of the vitamins is discussed in a chapter which begins with a discussion of nomenclature and a tabulation of the historical development followed by paragraphs on its occurrence and isolation. The main part of each chapter is concerned with the chemical aspects and deals with the procedures used for isolation, proof of chemical constitution and methods of synthesis. There are paragraphs on the determination of each vitamin, with copious references to the literature on the subject. There are also short accounts of the physiologic and pathologic aspects of each vitamin and a section on clinical test methods. There are many valuable tables, such as the list of vitamin D compounds, a table on the relative effectiveness of vitamin D from different sources for rats and chickens, and a table showing compounds having a vitamin K effect. The list of patents pertaining to vitamins which have been issued in the United States and some foreign countries, which appears in the appendix, is unique. The appendix also includes a discussion of the "vitagens," or substances which are similar in some respects to the vitamins. These are the essential fatty acids, the essential amino acids, the essential carbohydrates, choline and related compounds and the labile methyl group, and the essential organic sulfur containing compounds. It is evident that the author prepared this volume with the idea of covering all topics of vitamin research. The selection at times appears to be somewhat arbitrary, especially in the presentation of the historical aspects of the subjects. However, this volume will be valuable for all persons interested in the chemical aspects of the vitamins.

Genetics for Medical Students. By E. B. Ford, M.A., B.Sc. Cloth. Price, 7s. 6d. Pp. 162, with 10 illustrations. London: Methuen & Co., Ltd., 1942.

The medical curriculum has long given too little attention to heredity and genetics. This presentation assumes no previous knowledge of the subject and offers the reader a general survey with reference to medicine. The examples are taken primarily from the human being rather than from the fruit fly or the honey bee. The various chapters provide an understanding of the mendelian law of the genes and the blood groups. The explanations are so simple that medical students should be able to follow them with little difficulty. Especially valuable is the section on the detection of inherited characters. Here is a conspicuous example of the author's style and rationality:

> The question of eugenic reform encroaches upon one of the special preserves of the fanatic, the problem of Race. To some in these days, it has become a creed that such concepts as the British, the Nordic, or the Jewish races have, or have not, reality. In this matter, as in many others, extreme views appear to be incorrect.
>
> On the one hand, it is not admissible to maintain that such races are purely artificial. Their characters have some reality, and we have good evidence that they may be preserved when one people is immersed among others. It has already been mentioned that the blood group frequencies of Dutch and Russian Jews are much more alike than are those of the communities among whom they live. On the other hand, particulate inheritance allows the maintenance within each race of vast reserves of variability capable of producing, without racial mixture, far greater diversity than that separating any of them. Recurrent mutation allows the gene of one race to appear in another; and so great a part of their gene complex have even the most diverse of the human races in common that no shadow of specific distinction can be detected even between the most dissimilar of them. The proportion of genetic material which is different in the more nearly allied races cannot be great.

An appendix offers new information regarding cytology and a classified list of inherited characters and a good working bibliography.

The Art of Self-Control: How to Make Your Habits Work for You. By Ralph A. Habas. Cloth. Price, $2. Pp. 284. New York: Reynal & Hitchcock, 1941.

This is another of those books which are supposed to help people adjust better to the problems of life. It is not as bad as some and not as good as others. The author has taken a number of accepted, unaccepted and partially accepted beliefs of psychologists and presented them in such a way that they make interesting reading, give plausible explanations of rather superficial mental reactions and stimulate the person who is a little inadequate to do something about his problems. The author stresses habit correction, self control, the improvement of one's habits and other common psychologic problems. The examples that he cites are largely popular in nature, and the persons whom he quotes run the gamut from Benjamin Franklin to Eddie Cantor. The clinical psychologist is very skeptical about changing unfortunate habits or weak systems of thought without careful study relative to how the problem has arisen and without directing specific psychiatric tests to the cause and to the complicating features of each person's problems. For that reason it would seem almost impossible for any one to get his money's worth out of "The Art of Self Control." The normal person with some feelings of inadequacy will get little out of the book; the abnormal person who is groping for something to aid him and who is trying to avoid going to the physician will probably put it to some bizarre use. It must be admitted, however, that much of the psychology in it is currently accepted, although the acceptance arises from the fact that the lay observer can recognize the psychologic trait. It does not go into the root causes of maladjustment or inadequacy.

Journal of Proceedings and Addresses of the Forty-Third Annual Conference, The Association of American Universities, Held at the University of Nebraska, October 30, 31, and November 1, 1941. Paper. Pp. 114. Chicago: University of Chicago Press, [n. d.]

The report of this conference, which was held at the University of Nebraska, Oct. 30-Nov. 1, 1941, contains discussions of many of the current problems facing the institutions of higher learning of this country. The universities are prepared to undertake their part in improving Latin American relations and have authorized their committee in this field "to investigate perhaps with the aid of the United States Office of Education the problem of classifying and accrediting Latin American institutions of higher learning." Resolutions adopted by the association indicate the seriousness of the problems the univer-

sities are called on to face in connection with their efforts to maintain adequate personnel for teaching and research in the face of the demands of industry and government service. In the report are published the addresses given at the conference, several of which were by government officials. The subjects include "Social Security and Higher Education," "The Role of the University in the National Defense Program" by General Lewis B. Hershey, "American Education and Naval Requirements" by Admiral Chester W. Nimitz and a symposium on "University Procedures and Problems Growing out of Defense Activities."

The Education of Children in Hospitals and Convalescent Homes. The Committee for the Study of the Care and Education of Physically Handicapped Children in the Public Schools of the City of New York. Report of the Sub-Committee on the Education of Children in Hospitals and Convalescent Homes. Paper. Pp. 57. New York: Board of Education, 1941.

Children with Speech Defects. The Committee for the Study of the Care and Education of Physically Handicapped Children in the Public Schools of the City of New York. Report of the Sub-Committee on Children with Speech Defects. Paper. Pp. 61. New York: Board of Education, 1941.

These studies were made by subcommittees on the education of children in hospitals and convalescent homes, a subsidiary of a larger committee for the study of the care and education of physically handicapped children in the public schools of the city of New York.

The booklet on education of children in hospitals consists of a historical consideration of efforts to continue the education of children confined in hospitals and related institutions, followed by a study of medical relationships to the educational process, a survey of the educational process itself, reports of teachers engaged in the teaching of children in institutions, a discussion of all the facts presented by the committee, and recommendations.

In brief, the committee finds that with few exceptions physical equipment is satisfactory but that the educational process is not carried out at the fullest efficiency nor is there satisfactory coordination and understanding between physicians responsible for the care of children with chronic illness and teachers responsible for their educational progress. The recommendations, in brief, are as follows:

(*a*) That the institution have continuously sufficient children able to profit from instruction and that it furnish suitable conditions for instruction.

(*b*) Instruction for daily periods of less than one hour for less than one month is of doubtful value; that children be taught only on the recommendation of a physician; that adequate information concerning the physical condition and ability of the pupils be provided for the teacher.

(*c*) That occupational and recreational therapy, as distinguished from education, is not or should not be the primary purpose of the department of education.

(*d*) That within its physical limitations a child's educational program conform to the prevailing program in the public schools; that bedside instruction be given only where it will be educationally profitable and whenever possible in groups.

(*e*) That psychologic services of the institutions be more generally utilized for the benefit of children and teachers.

(*f*) That home instruction where necessary should follow hospitalization; that pupils discharged from hospitals and institutions be promptly admitted to school or special classes.

(*g*) That chronic cases requiring long hospitalization should be given high school training as their needs indicate.

The second booklet is by another subcommittee on children with speech defects. This report likewise consists of a historical review, a summary of procedures and studies, and a summary of findings plus recommendations. The principal recommendations of medical interest are six out of twenty-one recommendations as follows:

1. That children with severe organic and functional speech disorders be referred to hospital and educational clinics for treatment.
2. That each child selected for speech correction be given a general medical examination by the school physician.
3. That the school physician refer the child to appropriate specialists for special examinations when deemed necessary.
4. That records of medical examinations be made available to the speech correctionists.
5. That adequate psychiatric and psychologic social work be made available for speech handicapped children.
6. That the Board of Education urge on the hospitals the need for special clinics.

These monographs are primarily of interest to school physicians and pediatricians.

Family Nutrition. Published by the Philadelphia Child Health Society. Paper. Pp. 106, with illustrations. Philadelphia, 1942.

The authors of this little monograph of the Philadelphia Child Health Society recognize that adequate nutrition is largely a family problem and that suggestions about the purchase of foods had best apply to family groups. The monograph shows how the nutritional status of human beings may be measured, discusses the nutrients which are needed and describes the contribution which foods can make to supply the needed nutrients. There are brief discussions of appetite and of feeding problems, and of nutrition in relation to resistance to disease. It is shown how people in different income groups can still make good dietary selections though their purchasing power may be low. The book is well illustrated and documented. A considerable portion of the pamphlet is devoted to the selection of foods for persons of different ages. An interesting item is the suggestion that plenty of butter be used on bread and on vegetables; 2 to 3 ounces daily is considered desirable for boys and girls 6 to 12 years of age. There are of course other views; some authors hold the opinion that butter is best consumed by children in the form of milk. A considerable number of recipes for foods listed under the food stamp plan are given. Because this is published by the Philadelphia Child Health Society it is perhaps to be expected that recipes for scrapple and for pork and parsnip stew would be provided. The tables for nutritionally adequate meals for families with different incomes should be exceedingly useful. Altogether this monograph is crammed with the kind of information people will need to have if they are to be guided in their selection of foods by the advances in nutritional science.

Volumetric Analysis. By I. M. Kolthoff, Professor and Head of Division of Analytical Chemistry, University of Minnesota, Minneapolis, and V. A. Stenger, Analytical Research Chemist, The Dow Chemical Company, Midland, Mich. Volume I: Theoretical Fundamentals. Second edition. Cloth. Price, $4.50. Pp. 309, with 31 illustrations. New York: Interscience Publishers, Inc., 1942.

In accordance with the couplet

> The theory guides,
> The experiment decides,

this book is divided into two volumes, the first of which includes the theoretical treatment of volumetric chemical analysis. The first edition of volume I appeared in German in 1927 and was translated into English in 1928. A second German edition appeared in 1930, and this present work is an enlargement and revision of these predecessors. In keeping with the increasing use of volumetric reactions, the section on oxidation-reduction reactions has been extended, the list of oxidation potentials brought up to date, chapters on catalysis and induced reactions and on adsorption and coprecipitation phenomena have been completely revamped and a discussion of mixed crystal formation added. The influence of the authors' interest in polarography may be seen in the addition of a chapter on amperometric methods of analysis. One subject that could well have been included is a discussion of titration of azo dyestuffs. The volume is one of the most complete of its kind and may be used as a text or reference book. The theoretical discussions of such subjects as interfering substances, hydrolysis, precipitation reactions and effect of hydrogen ion concentration are accompanied by mathematical proof and methods of calculating errors and results. This makes the text more understandable and readable. This volume may be considered as a prerequisite to the use of volume II by students and laboratory technicians alike and should also prove invaluable to the teacher.

Food and Beverage Analyses. By Milton Arlanden Bridges, B.S., M.D., F.A.C.P., Consulting Physician, Seaview Hospital, Staten Island, New York, and Marjorie R. Mattice, A.B., M.S., Assistant Professor of Pathological Chemistry, Department of Medicine, New York Post-Graduate Medical School, Columbia University, New York. Second edition. Fabrikoid. Price, $4. Pp. 344. Philadelphia: Lea & Febiger, 1942.

The second edition of this excellent compilation of information about foods contains a revision of the original extensive list of food values and many new tables. The latter provide information about the hydrogen ion concentration of foods, their fiber content and the amount of sulfur, bromine, calcium, oxalate, phytins and purines contained in them. There are also new tables of the percentages of available carbohydrate and ionogenic iron in foods. The material is in a readily use-

ful form and there is a suitable bibliography. All these features make this one of the most complete single sources of information available on the composition of foods.

Among the most surprising facts that have been noticed in the present volume are the following items: Dandelion greens are said to contain as much as 6 mg. of iron in each hundred grams of fresh edible substance. Red carrots contain the surprisingly high amount of 8 per cent fiber. Fried cod roe contains 112 mg. of purine nitrogen in each hundred grams, whereas caviar is said to contain none. This would seem to be in error, because caviar certainly must contain considerable nuclear material. Roast duck contains 395 mg. of sulfur in each hundred grams, which is higher than the sulfur content of shrimp and all other foods with the exception of whelks, mustard and dried carrageen moss. Cod liver oil contains about 7,000 parts per billion of iodine, which means that a teaspoon of this beverage contains about as much iodine as there would be in a third of a gram of iodized salt. It is also stated in the book that the composition and fuel values of mixed alcoholic beverages vary greatly and are not susceptible of reliable analytic presentation.

Vitamins for Health. By Henry Borsook and William Huse, California Institute of Technology, Pasadena. Public Affairs Pamphlets, No. 69. Paper. Price, 10 cents. Pp. 32. New York: Public Affairs Committee, Inc., 1942.

This well written pamphlet is intended for persons who are looking for an easy guide to the use of vitamins, and hence it is directed to the public rather than to the medical profession. It fails somewhat in being as good as it should be for enthusiastic recommendation. While there are many items of value and much common sense is displayed in the selection of facts, there are some statements which could well be eliminated from a pamphlet of this sort. For example, it is stated that meat should not be fried for children. Certainly there is no valid reason why fried meat is not just as useful as roasted meat or stewed meat; indeed, there is evidence that frying meat is less destructive of thiamine than cooking by any other means. It is also asserted that a daily quart of vitamin D milk would not provide children with as much of this vitamin as they need; there is much evidence that milk containing 400 U. S. P. units of vitamin D to the quart is sufficient. It is stated that from 20 to 30 per cent of the thiamine content of flour is lost in baking; the better evidence indicates that the loss is only about 10 per cent in the baking of bread, most of this loss occurring in the crust and little in the inside of the loaf.

The emphasis of the book, of course, is on the vitamins, but it might be well if the authors called attention to some of the other factors, such as calcium, which also are important in the diet. The general effect of the pamphlet no doubt will be to encourage the use of vitamin preparations, which is perhaps anticipated by the inclusion of a number of hints for vitamin buying. There may be some justification to the point that persons who obtain most of their meals in restaurants and cafeterias where food is kept warm for hours, exposed on steam tables, do not obtain the vitamins they think they do from the vegetables which they eat. Here the remedy should be not to eat vitamin pills but to correct the underlying difficulties, if they do exist. It is doubtful that one could follow the instructions of the authors and select vitamin preparations wisely. Further, the authors have included no discussion in their pamphlet of labeling provisions for such preparations, as now required by regulations of the Food and Drug Administration, and their interpretations.

Memorable Days in Medicine: A Calendar of Biology and Medicine. By Paul F. Clark and Alice Schiedt Clark. Cloth. Price, $2. Pp. 305, with 29 illustrations. Madison: University of Wisconsin Press, 1942.

Many a chronology has been published of important dates in medicine. Such collections reflect the special interests of their authors. This book is a collection of dates that should be of interest to students in the fields of medicine and biology. For instance, on Aug. 25, 1841 Theodor Kocher was born in Switzerland; on Aug. 25, 1867 Michael Faraday died. Notes regarding each of the events cited are exceedingly brief and the interest of many of them remote. Any one interested in the historical aspects of science, however, will find study of these notes stimulating for further reading. An occasional medical anecdote helps to enliven the text.

The Meat You Eat. Report of the New York State Trichinosis Commission. Legislative Document No. 35, 1942. Paper. Pp. 141. New York, 1942.

The New York State Trichinosis Commission was created in 1940 and extended in 1941 for the purpose of studying and recommending methods of curbing trichinosis and other diseases contracted by eating infected meat. This book, the report of that commission, embodies a brief history of trichinosis, the present status of the disease and a chapter on trichinosis developments during 1941 by Dr. Willard H. Wright, chief of the Division of Zoology, National Institute of Health, United States Public Health Service. Much of the report deals with the value of meat and the status of meat inspection. The commission recommends that the state adopt a statewide compulsory meat inspection administered by local governments. A footnote states that this recommendation has just been approved. Previous recommendations of the commission were to the effect that slaughterhouses be maintained in a sanitary condition and licensed by the state, that intrastate pork products customarily eaten without cooking be processed to destroy live trichinae, that mixing of pork in hamburgers be barred and that uncooked offal from slaughterhouses be outlawed for feeding purposes. These were adopted in 1941. This report constitutes a useful contribution to the attack on trichinosis.

First Official List of Books, Pamphlets, Posters, Charts and Periodicals on Food and Nutrition. Compiled by the Technical Committee on Evaluation of Printed Material, New York City Nutrition Program. Paper. Price, 15 cents. Pp. 23. New York, 1942.

Frequently it is desirable to have posters or educational material about foods and nutrition and it is difficult to find just what one wants. Now the Technical Committee on the Evaluation of Printed Material of the New York City Nutrition Program has made a list of books, pamphlets, posters, charts and periodicals on foods and nutrition. The material is listed on twenty-three mimeographed pages. The selection is excellent and includes not only books and other material that are on the market but also material that is obtainable without charge. A few notations accompany the listing of some of the material. This compilation should be most valuable for all those who are asked about good books on nutrition or of available posters or charts on vitamins or on milk, meat, fruits, vegetables or other foods. The only drawback, perhaps, is that the list may appear to be too formidable to encourage the selection of a few items for careful study.

Wartime Meals: How to Plan Them, How to Buy Them, How to Cook Them. By Margot Murphy ["Jane Holt"], Food Editor, New York Times. Cloth. Price, $2. Pp. 258. New York: Greenberg, Publisher, Inc., 1942.

Now there is much interest in wartime meals and in possible shortages of and substitutes for foods. The author, who contributes a food column to the New York *Times* under the name of Jane Holt, has compiled an interesting volume. An important feature is the collection of recipes which make use of products that are economical and readily obtainable under present conditions. The book is a cook book blended with a guide to buying the least expensive foods and containing a dash of nutrition.

The Clarks: An American Phenomenon. By William D. Mangam. With an introduction by Edward Alsworth Ross, Professor of Sociology, University of Wisconsin, Madison. Cloth. Price, $2.50. Pp. 257, with 12 illustrations. New York: Silver Bow Press, 1941.

While this study may claim to be "one of the most amazing stories of American economy and life," it is primarily a sociological record with but little of medical concern. It undoubtedly illustrates an unpleasant but important phase of American sociological and economic history in the past century. The career of William Andrews Clark, self-made copper king, at one time "one of the richest men in the world," U. S. Senator from Montana, is typical of many ingenious, able, unscrupulous Western pioneers, overcredulous as to what money could buy. The fate and shortcomings of his sons and daughters occupy the remainder of a poorly told and poorly presented, sordid tale.

Queries and Minor Notes

THE ANSWERS HERE PUBLISHED HAVE BEEN PREPARED BY COMPETENT AUTHORITIES. THEY DO NOT, HOWEVER, REPRESENT THE OPINIONS OF ANY OFFICIAL BODIES UNLESS SPECIFICALLY STATED IN THE REPLY. ANONYMOUS COMMUNICATIONS AND QUERIES ON POSTAL CARDS WILL NOT BE NOTICED. EVERY LETTER MUST CONTAIN THE WRITER'S NAME AND ADDRESS, BUT THESE WILL BE OMITTED ON REQUEST.

DEATH FROM PRESTONE—TOXICITY OF GLYCOLS

To the Editor:—Yesterday I lost a boy aged 12 as the result of his drinking a combination of rhubarb and cherry wine to which had been added some Prestone antifreeze. Twenty-four hours subsequent to his drinking this combination he had convulsions, labored respirations and a temperature of 100 F. and lapsed into unconsciousness. A respiratory paralysis developed, and respirations were reduced to six per minute, which persisted for only a short time. The patient was treated symptomatically but died about thirty hours after the ingestion of the mixture. Is there an antidote for ethylene glycol, which, I am told, is the main constituent of Prestone antifreeze? The label on the can told what the preparation did not contain but did not give the ingredients of the contents. Is this in compliance with the law which governs poisons? Is Prestone poison? With so many people placing Prestone and antifreeze in cans and storing them in their basement, I should appreciate learning of what these mixtures consist or, at least, their antidote, so that I do not have to go again through the experience I had yesterday. **Carleton D. Aston, M.D., Sheridan, Wyo.**

ANSWER.—Prestone antifreeze is composed largely of ethylene glycol. The only other substances present are small amounts of antioxidants. Ethylene glycol is a poison which produces locally a mild irritation and systemically convulsions, with an eventual central nervous system depression resulting in respiratory paralysis as the usual cause of early death. The substance also produces liver and kidney damage, the extent of which depends on the amount of the material absorbed and the length of time of survival. In toxic effects ethylene glycol therefore resembles quite closely diethylene glycol, which was the toxic component of Elixir of Sulfanilamide-Massengill. Hanzlik and his co-workers (*J. Pharmacol. & Exper. Therap.* **67**:101 [Sept.] 1939) have reported the toxicity of the various glycols, and Geiling and Cannon (THE JOURNAL, Sept. 3, 1938, p. 919) reported on the toxic effects of diethylene glycol. The book "Toxicity of Industrial Organic Solvents" (Chemical Publishing Company of New York, 1938) discusses the toxicity of ethylene glycol in some detail. It is unfortunate that ethylene glycol belongs to the regrettably large group of poisons for which there is no specific antidote. The treatment must necessarily be entirely symptomatic. Recently Commissioner W. G. Campbell of the Food and Drug Administration was reported in *Drug Trade News* (Aug. 24, 1942, p. 33) to have stated in a letter to an inquirer that ethylene glycol belongs to a class of drugs which is unsafe for use even on prescription by a physician. Therefore it would be considered misbranded if distributed for human consumption under any circumstances. Prestone as an antifreeze does not come under the Federal Food, Drug and Cosmetic Act, nor does the Federal Caustic Poison Act apply. The product can be marketed in interstate commerce, other than through the mails, without the label indicating the poisonous contents of the container.

PERSISTENT ENDOMETRIAL BLEEDING AFTER IMPLANTATION OF ESTROGEN

To the Editor:—On March 11, 1941 a patient aged 32 had 3 pellets of a female sex hormone implanted in the thigh for symptoms of female sex hormone deficiency. She believes the hormone was either diethylstilbestrol or estradiol. She has had persistent bleeding ever since. This bleeding has been controlled to some extent by 20 mg. doses of progesterone only to recur after free periods of about five weeks. Would you advise any other treatment? Would you advise an attempt to remove the implant at this late date? **Morris B. Schwartzstark, M.D., Bronx, N. Y.**

ANSWER.—The type of female sex hormone which was implanted is not stated; i. e., whether it was natural estrogen or a nonsteroid chemical having estrogenic activity. One of the principal functions of estrogens is stimulation of endometrial growth. In the normal menstrual cycle the endometrial stimulation is estrogenic during the first half of the cycle and due to estrogens plus progesterone during the latter half. With a decreased estrogenic output about the twenty-fourth to twenty-fifth days of the cycle the endometrial stimulation is removed, with a consequent disintegration of the tissue and bleeding.

Implantation of estrogenic pellets causes prolonged stimulation resulting in a hyperplastic endometrium, which has a tendency to break down and bleed irregularly, or the bleeding may be more or less prolonged or continuous. Individuals respond differently to the same stimuli; therefore what is applicable to one may not be so for the other.

With the implantation of crystalline pellets of potent hormones, one has no control of the dosage, of the rate of absorption or of their activity. While the implantation of crystalline hormones has had some enthusiastic supporters, this method of treatment has several very serious objections, as mentioned. One might with as much justification implant massive dosages of morphine, atropine, quinine or any other powerful alkaloids. The profession and the public have been led to believe that most endocrine preparations can be used with as little knowledge and fear of harm as is required for taking acetylsalicylic acid.

Progesterone, which was used in this instance in 20 mg. doses, relieved the bleeding temporarily. The reason for this relief is perhaps the fact that progesterone for a time acted on the estrogen stimulated endometrium, changing it to a premenstrual type. After a certain time the endometrium reached a point where it had to disintegrate, and bleeding recurred.

In a case of this kind it would be well to remove the pellets and later treat the patient by controlled dosages, given intramuscularly, which is a more rational and a safer method of medication.

SARCOIDOSIS

To the Editor:—A man aged 30 and apparently in perfect health was discovered during a routine x-ray examination to have definite lesions in both apexes, more pronounced on the left. Because of this he was disqualified for service in the Officers' Reserve Corps. Later x-ray examination indicated spreading of the process. At no time has he had any symptoms or signs whatever—no loss of weight, no cough, no fever, no positive sputum, no weakness or lack of energy. He is 6 feet (183 cm.) tall and weighs 190 pounds (86 Kg.). The tuberculin test is negative. On the advice of competent men who saw the roentgenograms and examined him (physical examination absolutely negative) he entered a sanatorium early in May this year (more than a year after his first x-ray examination) and remained two months. He has spent the last month at home, observing sanatorium routine. While not proved, tuberculosis of the lungs was the working diagnosis. How, after all the evidence is in, Boeck's sarcoid is suggested as the more probable diagnosis. Assuming the later diagnosis to be correct, what is the significance? What does it mean? What must the patient do? What can be expect? He feels absolutely 100 per cent fit. Should he consider resuming his work? Any information will be greatly appreciated. **H. L. Youtz, M.D., Webster City, Iowa.**

ANSWER.—This patient is not unlike a large number of persons who have been sent to sanatoriums because of x-ray shadows thought to represent tuberculosis. The fact that he did not react to tuberculin is strong evidence that he does not have tuberculosis. It is a rarity for a person with clinical tuberculosis who is not in the terminal stage to fail to react, if potent tuberculin is properly administered. Indeed, all of 7,000 patients with known tuberculosis tested at the Chicago Municipal Sanitarium reacted. In the extremely rare case that might not react to tuberculin, one must recover tubercle bacilli from the sputum, the gastric contents or the feces before making a diagnosis of tuberculosis. In fact there are only two specific findings on which to make an accurate diagnosis of tuberculosis, namely the tuberculin test and the recovery of the organism. Symptoms, physical signs and x-ray shadows are not pathognomonic, since those caused by tuberculosis may be identical with those caused by several other diseases; indeed, there are pulmonary diseases which cannot be differentiated from one another even when the lesions are viewed with the naked eye post mortem.

With these facts so well established it is futile even to hope to determine the etiology of lesions from the shadows they cast on the x-ray film. In reality the x-ray inspection of the lungs is only a screen by which areas of disease can be located often long before they cause symptoms or produce significant physical signs. Once the locations of lesions are determined in this manner, other methods of examination are absolutely essential before one can arrive at the correct diagnosis.

Among the diseases which cast shadows on the x-ray film identical with those produced by tuberculosis is sarcoidosis. In 1899 Boeck, through careful study of tubercles in the skin, found a nontuberculous condition which has since been known as Boeck's sarcoid or sarcoidosis. It was then learned that this disease attacks numerous parts of the body, such as the skin, lymph nodes, tonsils, bones, eyes, salivary glands and lungs. In 1934 the term Besnier-Boeck disease was used to indicate not only the lesions in the skin but also the visceral manifestations of sarcoids. The latest edition of the Standard Nomenclature of Disease employs the term "sarcoidosis."

There has been considerable controversy concerning the etiology of sarcoidosis. Some have insisted that it is caused by tubercle bacilli, but such authors as Snapper and Pompen are firmly convinced that this disease is not a form of tubercu-

losis. They point out that the histologic structures of the sarcoids can be distinguished from that of genuine tuberculosis; caseous necrosis is absent, and in their experience tubercle bacilli have never been found by staining, culture or inoculation; that there is no tuberculin reaction in many cases with sarcoid, whereas there is nearly always a reaction in the presence of tuberculosis. Moreover, they call attention to necropsies on persons who have died of sarcoidosis which have revealed no evidence whatever of tuberculosis. Even inoculation of animals with necropsy material proved negative. These authors conclude that it must therefore be considered as a peculiar reaction of the reticuloendothelium with formation of pseudotubercles under influence of an unknown virus.

The symptoms of sarcoidosis closely resemble those of tuberculosis and, in fact, may be identical. When there is general dissemination of the sarcoids throughout the lungs, x-ray shadows may appear identical with those seen in miliary tuberculosis. Indeed, many cases have been diagnosed as miliary tuberculosis on the basis of x-ray shadows.

Sarcoids tend to undergo fibronic degeneration and may be completely replaced by connective tissue. When this is disseminated throughout the lungs, the x-ray leaves evidence of chronic fibrosis which is practically identical with that seen in chronic fibroid tuberculosis. Indeed, the lesions in the lungs may cast shadows which do not differ materially from those found in chronic tuberculosis, silicosis, lymphogranuloma, disseminated pneumonia and miliary carcinosis.

In the differential diagnosis the intracutaneous tuberculin test may be of great importance. Indeed, if there is no reaction it is almost certain that tuberculosis does not exist. Moreover, in cases of sarcoidosis tubercle bacilli cannot be found in the sputum, in gastric washings or in biopsies. When a tuberculin reaction is present, as is true in some cases of the disease, one does not have evidence that the demonstrable lesions are cast by tuberculosis, since primary tuberculosis may also exist and this always results in sensitivity to tuberculin. Therefore, by most careful clinical examination one is not able to make more than a tentative diagnosis of sarcoidosis. It is only by microscopic examination of the lesions taken from the skin or involved lymph nodes near the surface of the body and the absence of tubercle bacilli in them that a certain diagnosis is possible during life.

There is no specific treatment for sarcoidosis. On an entirely empirical basis numerous treatments have been used, such as general hygienic and dietetic care, subcutaneous injections of gold, chaulmoogra oil and enlarged doses of vitamin C. However, these have not been proved to be of definite value. Boeck found that cutaneous sarcoids respond favorably to the administration of arsenic. Therefore this drug may be used to advantage in moderate or large doses even up to 30 mg. of arsenic trioxide administered subcutaneously daily.

Usually the prognosis is good. Even patients who have sarcoidosis with extensive involvement of the lungs, pronounced enlargement of the lymph nodes, the liver and spleen and numerous sarcoids of the skin recover so completely that evidence of lesions can no longer be found in any part of the body by present methods of examination during life. However, some patients do not recover. For example, there may be so much fibrous degeneration in the lungs resulting in extensive sclerosis that insufficiency of the right ventricle occurs.

OXYGEN CONSUMPTION OF BRAIN DURING ANESTHESIA

To the Editor:—As abstract in The Journal, April 11, 1942, page 1334, of a paper presented before the Central Society for Clinical Research in November 1941 by John L. Lindquist and George V. Lorenz raises a question in my mind. Has the technic set forth there or any other been employed to determine whether potent anesthetics, e. g. cyclopropane especially, allowing the use of "high oxygen concentrations," really do permit high oxygen utilization or actually decrease the ability of the brain and other vital tissues to utilize oxygen? In other words, reversibly, to a certain point, do they throw "out of balance" the tissue-blood oxygenase? As far as is known has this point been investigated on relatively intact tissues (not minced brain tissue as employed by numerous investigations)?

Dell T. Lundquist, M.D., Palo Alto, Calif.

ANSWER.—A review of the literature reveals no studies on the oxygen consumption of the intact brain during cyclopropane anesthesia. The question as to whether or not narcotized tissues are better able to utilize oxygen when it is available in higher concentrations is important, but the theory that the mechanism of narcosis depends on inhibition of the oxidative activity of nerve cells is only one of several views. The depression of cellular metabolism during anesthesia may be a result rather than a cause of narcosis. The work of Lennox and Gibbs indicates that an unconscious state, such as epilepsy, may occur even though oxygen is freely available, and further that within certain limits the oxygen consumption of tissues is unaltered by changes in the oxygen tension of the blood.

Studies on the effects of various anesthetics on brain metabolism have hitherto been largely confined to in vitro measurements of oxygen consumption by minced brain tissue or slices. Handley and his co-workers made studies on intact animals but did not control the factor of blood flow. In their perfusion experiments they demonstrated a measurable reduction in oxygen and dextrose utilization with soluble pentobarbital depression and a return to normal or beyond with metrazol stimulation. Bulow and Holmes have stated that the oxygen uptake of minced brain tissue is not affected by the presence of anesthetic gases such as nitrous oxide and acetylene, but it has been clearly shown that a number of anesthetics cause a diminution in oxygen uptake by brain tissue. There are, as the question implies, several serious objections to the study of oxygen consumption using traumatized or minced brain tissue. A study of cerebral oxygen consumption during cyclopropane anesthesia in the intact animal would be of definite value.

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RECURRENT PHLEBITIS

To the Editor:—A man aged 54, whom I first saw in August 1938, dated the beginning of his ill health to the year 1932. Previous to that time, he stated, he had rarely had a sick day. In 1932 he had a severe case of furunculosis. Ever since, however, he has been susceptible to staphylococcic infections. Cuts and scratches develop pus rapidly, and he has a boil quite often. There are three boils at the present time—on the right elbow, left forearm and right leg. In 1935 he began to have trouble with his prostate. In 1940 he had a transurethral resection by fulguration. The diagnosis was simple hypertrophy. During his convalescence from this operation, although some five or six weeks later, he developed phlebitis of the left arm and right leg in the superficial veins. Simultaneously, in 1941, he developed bronchopneumonia and phlebitis of the deep vessels of the right leg. Recovery was slow, taking about twelve weeks. In June 1942 phlebitis of the superficial veins of the left leg developed and is responding slowly. I have tried many lines of investigation. The diet has been corrected; the free fluid intake is satisfactory. As far as possible the hygiene of the home has been corrected. The teeth have been checked repeatedly for infections; the tonsils have been extracted; apparently the appendix and gallbladder are normal; constipation has been corrected as well as possible. Aside from the phlebitis, the physical examination is negative; the renal function and urinalysis are also negative. The blood chemistry and counts are normal. The blood cultures are negative.

M.D., Virginia.

ANSWER.—The problem of prevention of recurrence of phlebitis is frequently complicated and cannot be solved satisfactorily. Examination of the status of the patient's peripheral arterial circulation should be made, since recurrent phlebitis is commonly a manifestation of thromboangiitis obliterans. Also when phlebitis affects recurrently a man older than 50 one should think of the possibility of carcinoma, since intra-abdominal and intrathoracic carcinoma are frequently associated with recurrent phlebitis. Blood dyscrasias which favor thrombophlebitis have presumably been excluded. One should pay particular attention to the possibility of polycythemia, which notoriously provokes thrombophlebitis. If careful reconsideration discloses no primary condition of which the thrombophlebitis might be a secondary manifestation, it becomes necessary to proceed hopefully with measures which lack specificity. Superficial, inflamed veins should be removed and cultures taken. If organisms are found, vaccine may be made and administered. The patient should stop smoking. The intermittent administration of some of the sulfonamide compounds may help. If trichophytosis is present, it should be treated vigorously. If thrombophlebitis continues to recur, prolonged treatment with the new anticoagulant substance dicoumarol may be advisable, although the administration of this substance is used chiefly in instances of thrombophlebitis in which the recurrences are close together.

MENTAL AND NERVOUS EFFECTS OF LIGHTNING SHOCK

To the Editor:—A patient in this hospital was struck in the head by lightning two years ago and has gradually become psychotic since that time. His Wassermann and spinal tests have been negative, but neurologically he shows an abnormal Babinski sign. Encephalogram of his head revealed no apparent damage. The staff of the hospital suspects some neuron degeneration. I would be grateful to you for any information on this subject.

J. J. Johnson Jr., M.D., Las Vegas, N. M.

ANSWER.—Being struck by lightning is essentially the same as being shocked by other types of strong electric current. In lightning the atmosphere acts as a conductor. Clinical manifestations involving the central nervous system range from mild concussion of the brain to fatal electrocution. When lightning strikes the head the damage usually is considered to be more transient than in electric shocks from other sources and of comparable intensity. However, owing to the grounding of both feet, involvement of the spinal cord is more frequent in lightning. Persons so struck also are often thrown into the air and fall down at some distance, thus sometimes suffering an additional trauma to the head which is often overlooked.

Some of the pathologic changes observed in the brain are considered to be specific for this type of accident by a number of authors. All elements of the brain, including ganglion cells, glial substance, meninges and blood vessels, may be involved. Chromatolysis, particularly in the cells of the medullary nuclei and of the Purkinje cells of the cerebellum, is frequent. The tunics of the larger blood vessels, particularly the membrana elastica, are often damaged. Around the smaller vessels perivascular shrinkage is a frequent finding. In the more deeply situated parts of the brain the ganglion cells succumb more easily than the glia. The meninges may react diffusely.

Accordingly, the neurologic findings in such cases are extremely variable. Frequently the clinical symptoms are isolated and merely evidence of damage in some part of the brain. But the consequences of electrical accidents have been observed to simulate systemic neurologic diseases, although at times the trauma may act merely as the precipitating or aggravating factor in making a preexistent disease clinically evident. Arteriosclerotic brains are said to be most easily and most severely affected by electrical accidents.

As to mental conditions, it is unfortunate that the type of psychotic behavior displayed by this patient is not indicated. In industrial electrical accidents involving the head psychoneurotic reactions are frequent, ranging from mild traumatic neuroses to cases of fullblown hysteria; but they have rarely, if at all, been observed following lightning. Behavior disturbances with loss of inhibition has been observed in children struck by lightning. Also a few cases of acute delirious state with hallucinosis, of short duration, have been described. However, the most frequent mental syndrome following such accidents is a psychosis closely resembling dementia paralytica. Gradual intellectual deterioration, and even complete dementia, changes in personality, grandiose ideas, intermittent hypochondriacal or depressive states, and occasional hallucinations have been noted in these cases of so-called pseudo-dementia paralytica. Tremors, speech and pupillary disturbances, even signs of dementia paralytica with tabes, may be present. Care, however, should be taken to rule out a true dementia paralytica with negative serologic reaction, particularly in view of the predilection of this disease for becoming clinically manifest following traumatic head injuries. In this connection it should also be remembered that a schizophrenic or other type of mental disorder may have preexisted and simply been precipitated by the lightning accident or the accompanying fall.

The prognosis in the case in question, in view of the onset, duration and presumable organic damage, appears rather poor. Treatment should be expectant and symptomatic; shock therapy of any type appears contraindicated in this case.

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DEATH FROM ILLUMINATING GAS

To the Editor:—A woman was found lying on the floor in her kitchen, dead. The gas jets were wide open, and a window and a door to the room were also open. The pathologist who performed the autopsy says the evidence indicates that death was by gas poisoning. The person accused of the crime admits binding the woman's hands and feet and leaving her lying on the floor but claims to know nothing about the gas. The defense lawyers wish to claim that gas was inhaled before the assault and that it would be impossible for a person lying on the floor to inhale enough gas to cause death when a window and door to the room are open. Is this true or does not gas, being heavier than air, sink to the floor?

J. Street Brewer, M.D., Roxboro, N. C.

ANSWER.—Death from illuminating gas can be established by a quantitative test for carboxyhemoglobin in the blood. Concentrations of 30 per cent or over indicate death by carbon monoxide. Without this test an opinion would be purely conjectural and would require further information. For example: 1. Did the necropsy reveal a cherry red color of the blood and organs and was the postmortem lividity cherry red in color? 2. How many gas jets were open? 3. What were the dimensions of the room? 4. How far was the body found from the open gas jets? 5. Was there an opportunity for a draft through the room? 6. What were the meteorological conditions on the day of death?

From the facts submitted it would be impossible to express an opinion whether the assault was perpetrated after the inhalation of gas. In any circumstances this would be a difficult matter. However, it is difficult to conceive that an assailant would bind a woman's hands and feet, turn on the gas and return later for the assault. If the gas permeated the room in sufficient concentration to kill the victim, the assailant would certainly become asphyxiated if he remained.

While illuminant gas is slightly lighter than air, it could accumulate and has accumulated in rooms with windows and doors open in sufficient quantities to kill an inmate.

MASSIVE EDEMA OF FEET AND ANKLES OF UNDETERMINED CAUSE

To the Editor:—A white woman aged 42 has a massive edema of the feet and ankles. The cardiac, blood and urinary findings are negative. The edema is periodic and the swelling is usually occasioned by hot weather. Sometimes the swelling subsides almost entirely during the night, but when the arises and after pursuing her daily routine for several hours the feet and ankles again swell to enormous proportions. There is no redness and little or no pain, but great discomfort and embarrassment. Could this be an incipient erythromelalgia? These conditions have obtained for several years. Would you please suggest a proper regimen? Any other information will be appreciated.

James A. Laird, M.D., Chicago.

ANSWER.—As a general proposition the initial symptom of erythromelalgia is pain. The pain is succeeded by redness and swelling, but the swelling does not usually assume massive proportions. The fact that there is no disease of the circulation or kidney would point toward a local cause. Swelling of the extremities in hot weather is not uncommon in those who have congenitally deficient veins and in varicose veins. Such swelling does not assume massive proportions, however, unless the varicose veins are quite evident. One should next consider obstruction to the venous or lymphatic flow. Tumors of the pelvis and old thrombophlebitis of the pelvic veins are leading causes of such obstruction. An old lymphadenitis is a possible but not probable cause. Parasitic infestation of the lymph spaces must be considered.

Until the cause can be discovered, a definite plan of treatment is difficult to prescribe. In general the weight should be reduced if there is any tendency to overweight. The feet should be kept elevated at every opportunity, and some sort of additional support should be given to the circulation. An elastic or mesh stocking should be applied while the swelling is absent. This support should extend from the tips of the toes to well above the knee. While this will not remove the cause of the swelling, it will certainly improve the esthetic effect and remove some of the embarrassment.

STERILIZATION OF BITCHES BY X-RAYS

To the Editor:—Is it practicable to sterilize female dogs by means of high voltage roentgen therapy? I realize that ovulation is brought about by mating, while "heat" is the result of endocrine stimulation. If it is possible to inactivate the ovaries, will the animal still have estrus?

M.D., Pennsylvania.

ANSWER.—Veterinarians do not consider it practical to sterilize female dogs by means of high voltage roentgen therapy. In a few cases bitches have been sterilized by this method and estrus was inhibited. When all ovarian tissue is removed surgically, as this is usually done in veterinary practice, estrus always ceases.

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FLOATING OPACITIES IN HIGH MYOPIA

To the Editor:—I should like to have the most recent information on the formation and treatment (prevention) of floating opacities in high myopia.

Jacob Aisenstat, M.D., New York.

ANSWER.—There is really no effective treatment for the floating opacities which occur in high myopia. They are due to disorganization of the vitreous, apparently as a result of the increased size of the vitreous cavity, which necessitates the passage of increased amounts of fluid into the vitreous gel. Such opacities in themselves do not affect vision and merely result in slight annoyance to certain persons. Such persons can only be reassured as to their harmless character. Opacities actually due to myopia must be distinguished from those occurring in chorioretinitis of infectious origin and from those which occur at the onset of retinal detachment. Careful fundus study should distinguish these conditions, each of which does require treatment. The atrophic fundus changes of high myopia must not be confused with those of chorioretinitis. While it is true that retinal detachment occurs more frequently in myopic eyes and that changes in the vitreous play a part in its development, it would seem wrong to alarm every patient who develops vitreous opacities by mentioning the danger of detachment. Persons with high myopia may well be cautioned against violent exertion involving severe muscular strain or the danger of blows to the head, but use of the eyes in reading does not involve a danger of retinal detachment.

INTERMITTENT HYDRARTHROSIS

To the Editor:—A woman aged 35 has had an intermittent hydrarthrosis of the right knee for the last five years. Without fever or other systemic symptoms, the knee joint fills with fluid within twenty-four hours and the condition subsides spontaneously after two or three days. There is no history of an injury to the knee, although the patient says that since her high school days the knee would occasionally "give out" momentarily without swelling or pain. The hydrarthrosis first appeared about a year after the patient's first pregnancy; it disappeared during her second pregnancy and recurred about six months after the birth of her second child. The swelling now appears twice each month—about midway between the menstrual periods and within twenty-fours of the onset of each period. Her health is otherwise good. She has a mild vasomotor rhinitis and a familial allergic background. Her blood shows a 3 per cent eosinophilia. The erythrocyte sedimentation rate is normal. In the last five years she has been subjected to removal of a devitalized tooth, vaccine therapy, a course of progesterone therapy, histaminase and histamine "desensitization," all without effect on the hydrarthrosis. Any suggestions would be welcome. Herman J. Smith, M.D., Des Moines, Iowa.

ANSWER.—Most cases of intermittent hydrarthrosis of the type described usually represent an atypical form of rheumatoid arthritis. The very fact that the patient experienced complete remissions during her first and second pregnancies argues strongly in favor of this diagnosis.

Aspiration and detailed chemical analysis of the synovial fluid might prove to be of considerable diagnostic help.

The 3 per cent eosinophilia is not unusual for a person with rheumatoid arthritis.

As to treatment the following should be considered: rest, a high caloric, high vitamin diet, an ace bandage at the time of the effusion and any other supportive measures which seem indicated. High voltage roentgen therapy and synovectomy have at times been thought to be helpful in cases of this type.

DENTAL EXTRACTION AND EMBOLISM

To the Editor:—Will you please be kind enough to answer a question for me? I am a dentist and I wonder if you know of any data which might substantiate the claim that a patient had died from embolism following the extraction of teeth. Any information which you may supply on the subject of emboli and their relation to the extraction of a tooth or teeth will be most appreciated. Walter E. Brehm, D.D.S., Logan, Ohio.

ANSWER.—Careful search of the medical literature has disclosed no reported instance of massive embolism of the lungs following the extraction of teeth. This is parallel with the experience of several oral pathologists and clinicians who have not heard of such an occurrence. On the other hand, minute emboli following tooth extractions are probably of frequent occurrence but produce no noteworthy clinical symptoms. But if these emboli carry bacteria, and especially pathogenic bacteria, they may cause septic processes in the lungs or elsewhere. Deaths have been reported in the form of septicemia or pyemia and as following such a train of events. Recently there have been a few reports of positive blood cultures immediately after tooth extractions, particularly of teeth that are quite loose or surrounded by deep pyorrhea pockets.

SUPPURATIVE LYMPHADENITIS FROM TULAREMIA

To the Editor:—What can be done for a girl 4 years of age who has a constant draining sore in the left axilla? The cause is tularemia. This disease was contracted eight months ago. The first lesion occurred on the left hand and the base of the index finger. She was rather sick for a month and seemed to respond to sulfathiazole medication. Since the onset she has had several bouts of fever and at that time the axillary gland would swell and drain. Any information would be greatly appreciated. Thomas Dechaire, M.D., Westmoreland, Kan.

ANSWER.—At this stage secondary infection with skin cocci probably contributes considerably to the chronicity of the suppurative lymphadenitis. Establishment of adequate dependent drainage, with wet dressings of magnesium sulfate solution, and twice daily irrigations of the wound with an aqueous solution of 1:1,000 each of methylrosaniline and acriflavine base should suffice to insure healing.

BLOOD PRESSURE AT HIGH ALTITUDES

To the Editor:—Kindly describe the effect on the otherwise normal blood pressure of an altitude of 30,000 feet. M.D., New York.

ANSWER.—At an altitude of 30,000 feet it is impossible to maintain sufficient oxygen tension in the tissues to support life unless supplementary oxygen is supplied by adequate oxygen equipment. For this specific circumstance (barometric pressure 225) an inspired mixture the minimum content of which must be over 80 per cent oxygen would be necessary. If the oxygen tension in the tissues is maintained at a normal level there should be little appreciable change in blood pressure at that altitude.

REACTION TO SULFATHIAZOLE IN COLITIS

To the Editor:—A young man has a case of chronic ulcerative colitis which has completely failed to respond to the regular treatment, including sulfaguanidine by mouth. I am considering the solution of sulfathiazole has ever been used locally to the lower colon in the form of an enema in this condition and if it would have any ill effects other than the regular reactions which may be expected from this drug.

R. S. Loader, M.D., Victoria, Texas.

ANSWER.—Ill effects would probably not be produced by a solution of sulfathiazole, "other than the regular reactions which may be expected from the use of this drug." The solubility of sulfathiazole in water is only about 0.06 per cent, but it would be advisable to make suitable determinations from time to time to ascertain whether undesirable effects are being produced.

TOTAL ALOPECIA

To the Editor:—In The Journal, June 27, 1942, page 760, M.D., Arizona, inquiries about the endocrine aspects of a case of alopecia areata which became total despite treatment with thyroid and anterior pituitary but improved for a short time during pregnancy and lactation. The endocrine dysfunction may possibly be secondary to a focus of infection or to autonomic imbalance. In the following case is this objective? A white woman aged 34, married, with two children, seen Jan. 9, 1939, complained of frontal headaches, occasional dizziness and loss of hair of the head and eyebrows for ten months. During that time she had been under the care of a dermatologist, a gynecologist, and an endocrinologist without result. She wore a wig. Examination revealed total baldness, lack of eyebrows and lashes except for a few hairs remaining at the right lower lid, and sparse axillary and pubic hair. The Wassermann reaction was negative, the urine normal, the hemoglobin 90, pulse rate 84, blood pressure 112 systolic and 74 diastolic, weight 109 pounds (49 Kg.), menses regular and the bowels regular. Examination of the heart, lungs, abdomen and pelvis was negative. Roentgenograms of the teeth, sinuses and sella turcica showed nothing pathologic. Vision is 20/20—1. The media and fundi are normal. The visual fields for white and colors are normal. The total refractive error under a mydriatic is +0.50 D. sph. +0.50 D. cyl., axis 90. Prescription was +0.50 D. cyl., axis 90, both eyes, for headaches. Examination of the ears, nose, throat and larynx was negative except for small buried tonsils, from which pus could be obtained on suction. January 16, 1939, there was a thick postnasal drip from the ethmoids; Proetz treatment was instituted. January 30 the patient reported headaches relieved by glasses. April 1, pus was obtained on suction from the tonsils and ethmoids. July 14 the nose was clean; there were no headaches. July 19 a local tonsillectomy was done. September 5 a few scattered patches of lanugo were present on the scalp. She was referred for ultraviolet treatment plus massage of the scalp. August 27, 1940 there was complete return of hair, eyebrows and eyelashes after about one year. The exact significance of the result obtained after prescribing glasses, cleaning up an ethmoid infection and removing the tonsils is open to discussion. The dermatologist sees many cases of alopecia areata and totalis in the course of practice. If more of these patients were thoroughly worked up and treated, possibly the results would be better. Another case of alopecia areata of the scalp and beard in a physician was cured by attention to the gastrointestinal tract. This patient was allergic to a few foods and had a low grade ileocolitis. Removal of the offending allergens and alcohol, a low protein diet and injections of an autogenous streptococcus vaccine produced a cure after dermatologic treatment had accomplished nothing. When the hair returns it is usually absolutely white and gradually becomes pigmented. The process requires about a year if the patches are fairly large. Sidney P. Lovey, M.D., New York.